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The Unexpected Global Financial Crisis

Researching Its Root Cause

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Abstract

The world is currently still struggling with the aftermath of the worst economic crisis since the Great Depression. Following a description of the eruption, evolution and consequences of the global crisis, this paper reviews alternative hypotheses for the causes of the global financial crisis as well as their empirical evidence. The paper refutes the frequently voiced view that the global crisis was caused by global imbalances that reflected economic policies of East Asian countries. Instead, it argues that global imbalances were the result of excess demand in the United States, resulting from both the public debt in the United States arising from the Afghanistan and Iraqi wars and tax cuts and the overconsumption by households supported by the wealth effect from the housing bubble in the United States. The housing bubble itself was the outcome of the Federal Reserve's low interest rate policy in the aftermath of the burst of the "dot-com" bubble in 2001, the lack of appropriate financial regulation, and housing policies aimed at expanding the mortgage market to low-income borrowers. It was possible to maintain the large trade deficits of the United States for such a long period of time because of the dollar's reserve currency status. When the housing bubble in the United States burst, the global crisis ensued. The paper also analyzes why China's trade surplus increased significantly in general and with the United States in particular in recent years, and argues that this increase was caused by both the relocation of the labor-intensive tradable sector of East Asian economies to China and high corporate saving rates in China as a result of its dual-track approach to reform.

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The Unexpected Global Financial Crisis: Researching Its Root Cause

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Sector Board: EPOL

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The Unexpected Global Financial Crisis

I. Introduction

1. The world is currently still struggling with the aftermath of the worst economic crisis since the Great Depression. While a handful of economists predicted the crisis, it was largely unforeseen. As late as April 2007, the IMF in its World Economic Outlook concluded that risks to the global economy had become extremely low, and that, for the moment, there were no great concerns. Despite large and widening global imbalances before the crisis, optimism on the robustness of the world economy emanated from confidence in the United States' system of financial regulation, its financial and political system and the fact that it had the world's largest capital markets.[2] Global imbalances were viewed as sustainable, given that rapidly growing developing economies needed a secure place to invest their funds for diversification purposes and increased global financial integration was deepening global capital markets and allowing countries to sustain higher debt burdens over the long term. In addition, the U.S. was considered to have superior monetary policy institutions and monetary policy makers.[3] Only a few economists did not share these views and expressed concern about a disorderly unwinding of rising global imbalances, as well as of the housing bubble.[4]

2. The concerns of these economists were dramatically validated by the unfolding of the global financial crisis since September 2008. The coordinated policy response by the G-20 nations helped the world avoid a global depression. According to the IMF, these interventions involved cash infusions, debt guarantees, and other assistance to the tune of a staggering $10 trillion.[5]

3. However, economic growth remains fragile. Recovery is taking place at two different paces: on the one hand, there are the high-income countries that are experiencing a sluggish recovery. On the other hand, there are the developing countries whose economic performance is far superior to that of the advanced countries. The recovery of the world economy is threatened by high unemployment in the advanced economies, high levels of sovereign debt and the crisis in

[2] See Reinhart and Rogoff: "This Time is Different", p. 214.
[3] Bernanke (2005a): "The Global Savings Glut and the U.S. Current Account Deficit". Speech given at the Homer Jones lecture, St. Louis, Missouri.
[4] These economists included Nouriel Roubini; e.g., in "The Rising Risk of a Systematic Financial Meltdown: The Twelve steps to Financial Disaster", February 5, 2008, online at www.roubini.com/analysis/44763.php. In addition, Raghuram Rajan, the Chief Economist of the IMF, warned of a collapse of the financial system in his Jackson Hole speech in August 2005.
[5] "The State of Public Finances Cross-Country Fiscal Monitor; November 2009," IMF Staff Position Note, November 3, 2009 (Tables 3 and 4).

the Euro-zone.[6] Moreover, the severity of the recent global crisis has highlighted the need to revisit basic policy recommendations, e.g., in the area of capital flows, the supervision of the financial sector, and macroeconomic management.[7] And with emerging and developing economies recovering from the global economic crisis much faster than advanced countries, it also reinforced a trend toward a new multi-polar world economy with several growth poles, a trend that had already become apparent before the crisis.

4. The precise genesis of the global crisis remains subject to debate. While global imbalances are widely viewed to have played an important role in its evolution, some economists consider them to be the primary cause of the crisis, while others view them as only facilitating its development.[8] A correct diagnosis of the genesis and driving forces behind the crisis is, however, important in order to draw appropriate conclusions to prevent its recurrence.

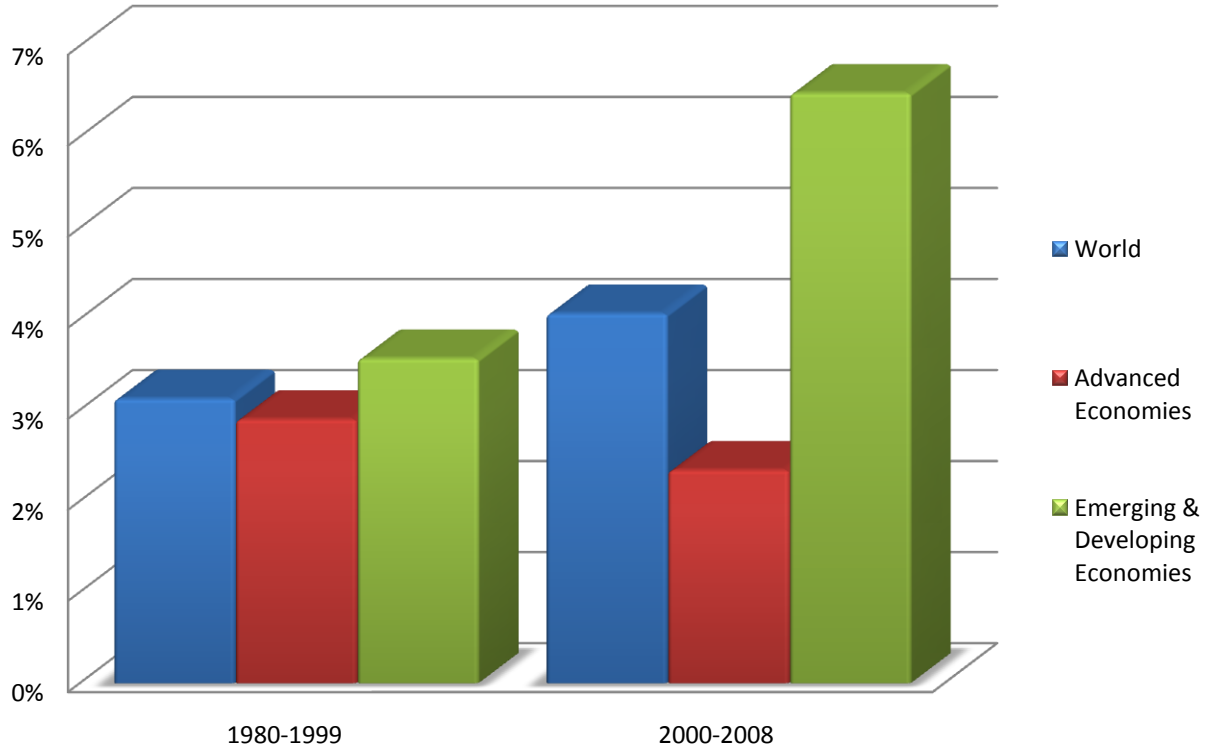
5. Section II describes the world economy before the crisis, and the eruption, evolution and consequences of the global crisis. Section III reviews alternative hypotheses for the causes of the global economic crisis as well as their empirical evidence. We will refute the frequently voiced view that the global crisis was caused by global imbalances that reflected the export-oriented strategy of East Asian countries, the accumulation of international reserves for self-insurance motives by countries with surpluses, China's undervaluation of its exchange rate and the global savings glut. Instead, we will argue that global imbalances were the result of the large excess demand in the U.S. over an extended period—the financing of which was made possible by the reserve currency status of the US dollar. This excess demand resulted from both the public debt in the U.S. arising from the Afghanistan and Iraqi wars, tax cuts and the overconsumption by households supported by the wealth effect from the housing bubble in the U.S. The housing bubble itself was the outcome of the Fed's low interest rate policy in the aftermath of the burst of the "dot-com" bubble in 2001, the lack of appropriate financial regulation after the deregulation in the 1980s and housing policies aimed at expanding the mortgage market to low-income borrowers which was primarily a result of lobbying by the financial sector aimed at increasing profits through further deregulation. When the housing bubble in the U.S. burst, the global crisis ensued. Section IV discusses why China's trade surplus increased significantly in general and with the U.S. in particular in recent years. We will argue that this increase was caused by both the high corporate saving rates in China as a result of its dual-track approach to reform and the relocation of the labor-intensive tradable sector of East Asian economies to China, which started in the 1980s but accelerated after China's accession to WTO in 2001. Finally, the paper reflects on the lessons for policy prescriptions from the crisis.

[6] Global Economic Prospects 2011.
[7] The need for changing the thinking and policy of macroeconomic management is discussed in the paper *Beyond Keynesianism* (chapter 3).
[8] See Portes (2009) and Krugman (2009) for the former hypothesis. Rajan (2010), Lin (2010), Roubini and Mihm (2010), Laibson and Mollerstrom (2011) and Obstfeld and Rogoff (2010) for the latter.

II. The World Economy before the Crisis

6. The global economic crisis that began in 2007 was largely unexpected. Just before the crisis, the IMF in its bi-annual World Economic Outlook announced that risks to the global economy had become extremely low, given that capital inflows pushed up borrowing and asset prices, while reducing spreads on risky assets.[9] Also, since 2000, the world economy had continuously expanded at high rates. High growth of the world economy was spread across advanced, emerging and developing countries and allowed unemployment and poverty to decline (Figure 1). High demand from fast-growing developing and emerging markets led to high commodity prices that benefited growth in natural resource-rich countries.

Figure 1: Average Growth Rates Before the Crisis

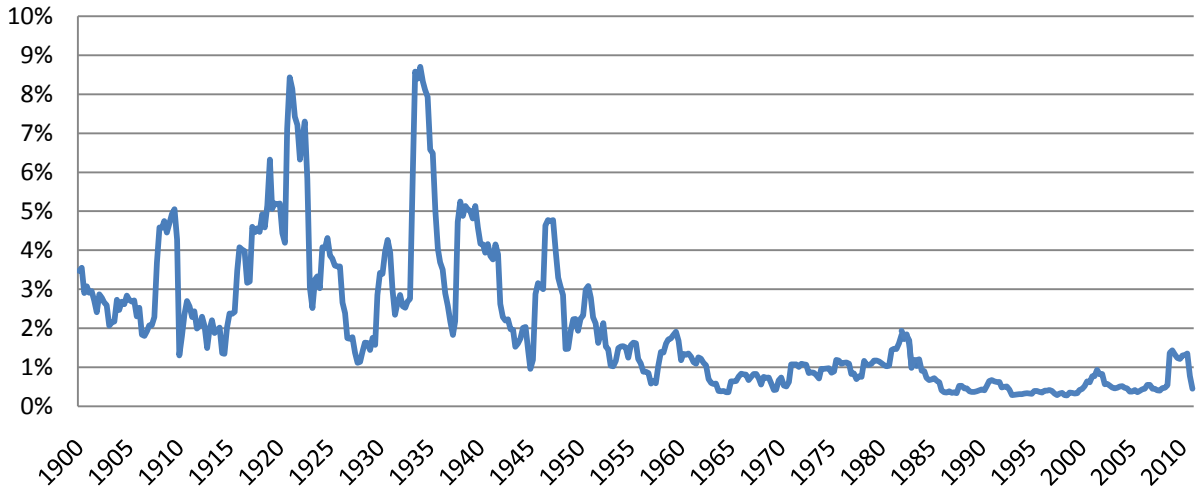


Source: International Monetary Fund, World Economic Outlook.

[9] IMF World Economic Outlook, April 2007.

7. Optimism on economic prospects and the sustainability of the strong growth performance also emanated from the fact that the volatility of the business cycles in advanced industrial countries had been declining (Figure 2). On the one hand, recessions had a less severe overall impact and were of shorter duration. For example, the 1987 stock market crash in the U.S. did not cause a recession; also, the 1990–91recession was relatively short and shallow. Similarly, the burst of the "dot-com" bubble had a relatively limited effect in the form of a mild recession and a sluggish recovery. On the other hand, expansions lasted longer. This success in stabilizing the business cycles has been referred to as the "Great Moderation", defined as an era of low inflation, high growth and modest recessions.[10]

Figure 2: Standard Deviation of U.S. Gross National Product Growth



Sources: Bureau of Economic Analysis; National Bureau of Economic Research, "The American Business Cycle: Continuity and Change," edited by Robert Gordon.

8. The "Great Moderation" was considered to be the result of several developments: for one, business and financial deregulation as well as financial innovation had created a more flexible and adaptable economic system. Financial assets were considered to be less risky than before, giving rise to higher levels of financial intermediation which in turn helped fuel growth as well as greater financial innovation, especially through hedge funds. Volatility of business cycles had also declined because the world experienced abundant liquidity—partly reflecting surplus savings in a number of emerging markets—giving the false sense that stability was due to some structural improvement in the financial system. Also, growing globalization and free trade, partly

[10] The term "Great Moderation" was coined by James Stock and Mark Watson (2002): "Has the Business Cycle Changed and why?"

boosted by China's entry into the World Trade Organization in 2001, as well as the buoyant growth of China and other newly emerging economies was expected to keep inflation at bay even as global growth accelerated.[11]

9. Moreover, many economists had expected that economic turbulences in one country could not easily spread because decoupling had taken place to some extent. The decoupling thesis argued that the booming economies of Brazil, Russia, India and China would rely on domestic demand and would therefore not be affected by the meltdown of the subprime market.[12] Also, many policymakers were not aware of the extent of inter-linkages in the financial industries of Europe and the United States that contributed to the spread of the crisis.

10. Accompanying the period of strong expansion of the world economy was the emergence of significant global imbalances, characterized by large current account surpluses in East Asia and Europe and a widening current account deficit in the United States. Views on the importance of these global imbalances differed sharply. Some economists (such as Fred Bergsten and Miranda Xafa) viewed them as a threat to the world economy. In a testimony before the United States Congress, Bergsten (2007) stated: "*The global imbalances probably represent the single largest current threat to the continued growth and stability of the U.S. and world economies*." Similarly, Xafa (2007) argued before the crisis that "*The rising U.S. current account deficit has increased concerns among policymakers about a possible abrupt disruption and disorderly unwinding, involving a major sell-off of dollar assets, a sharp increase in US interest rates, and an associated sharp reduction in U.S. absorption. Such an abrupt unwinding of imbalances, triggered by a sudden loss of market confidence in the dollar, would obviously have negative spillover market effects on financial markets and the global economy*." Others (such as Bernanke 2005a) considered imbalances to be the natural outcome of the underdevelopment of the financial system in developing countries which prompted sustained increases in the demand for U.S. dollar-denominated financial assets. With asymmetries in the demand for financial assets between developing and emerging markets on the one hand and advanced economies on the other hand unlikely to disappear any time soon, this view considered global imbalances to be sustainable and therefore unlikely to present a risk to the global economy.

[11] Roubini and Mihm 2010 , p. 26-31.

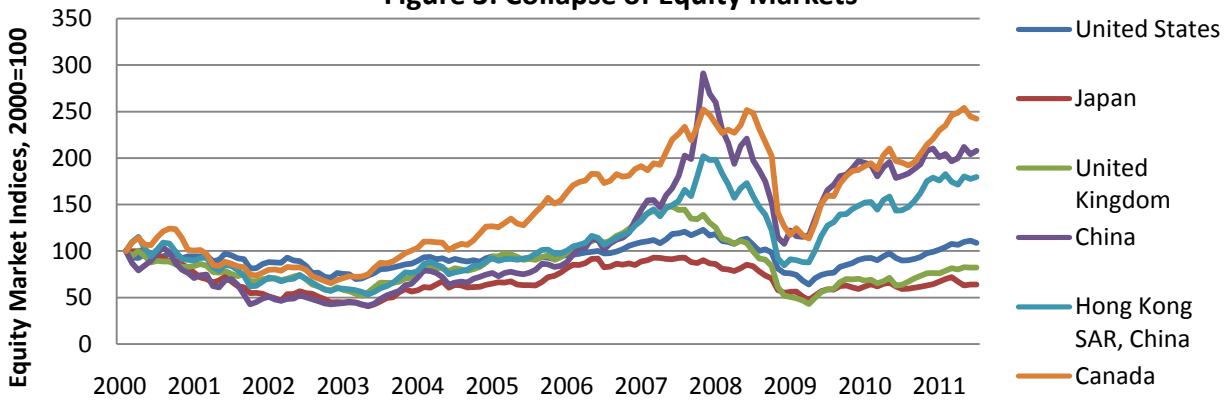
[12] Roubini and Mihm 2010, p.115. The idea was first promoted by Jim O'Neil of Goldman Sachs, and then rapidly became the consensus. For example, in September 2008, German Minister of Finance Peer Steinbrueck declared: "The crisis is above all an American problem. The other G-7 ministers share this opinion."

III. Eruption, Evolution and Consequences of the Crisis

Eruption

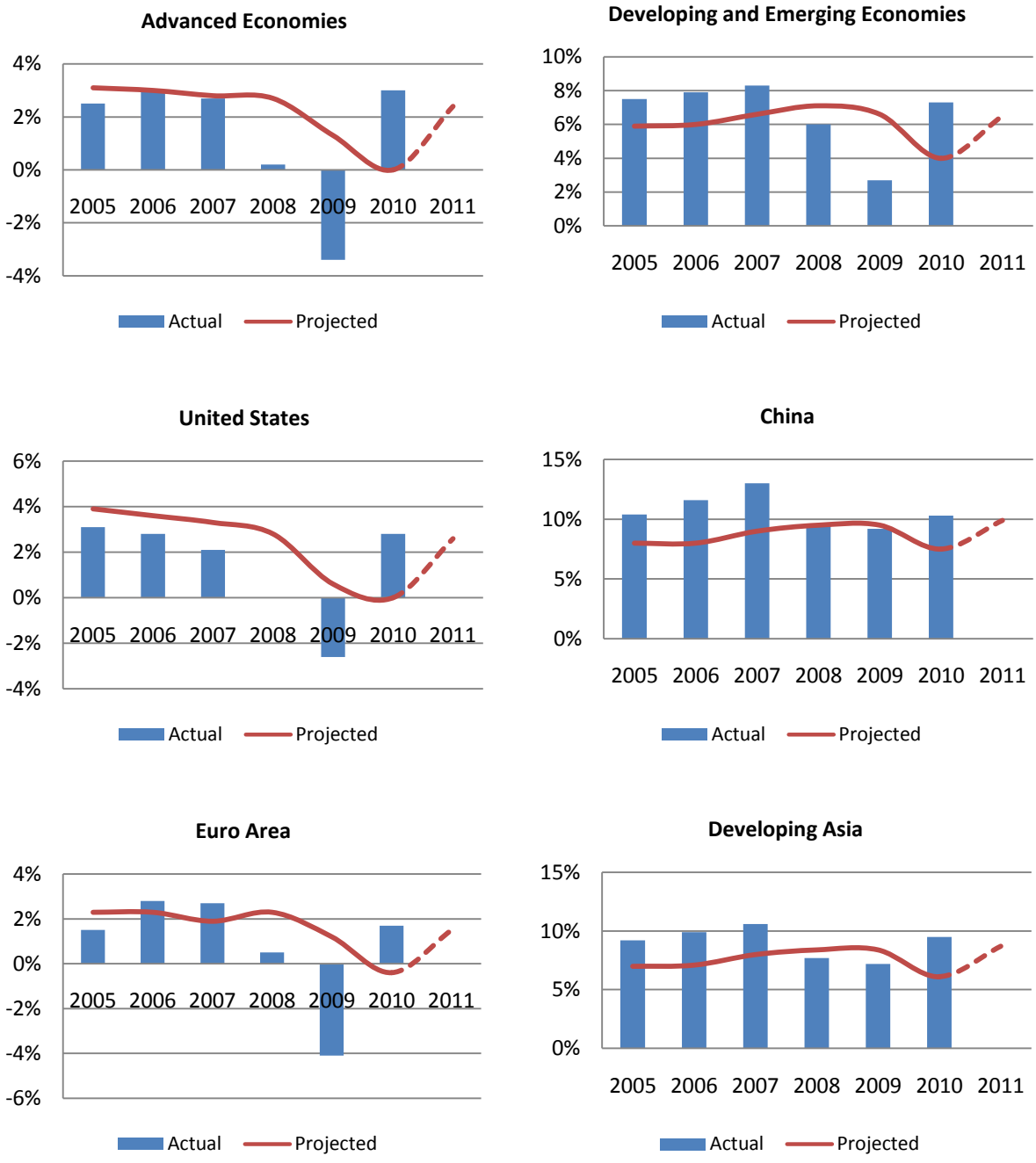
11. The global financial crisis erupted in September 2008 with the collapse of Lehman Brothers, largely as a result of accumulating defaults on mortgages and derivative products. The ensuing financial sector crisis quickly led to a significant decline in credit to the private sector as well as to a sharp rise in interest rates. The resulting collapse in U.S. financial institutions led to a collapse of equity markets (Figure 3) and of international trade and industrial production and spread to other advanced economies as well as to emerging markets and developing countries. Real growth around the world declined sharply below projections and advanced economies, including the U.S., entered into a recession (Figure 4). Only China and developing Asia maintained strong growth.

Figure 3: Collapse of Equity Markets



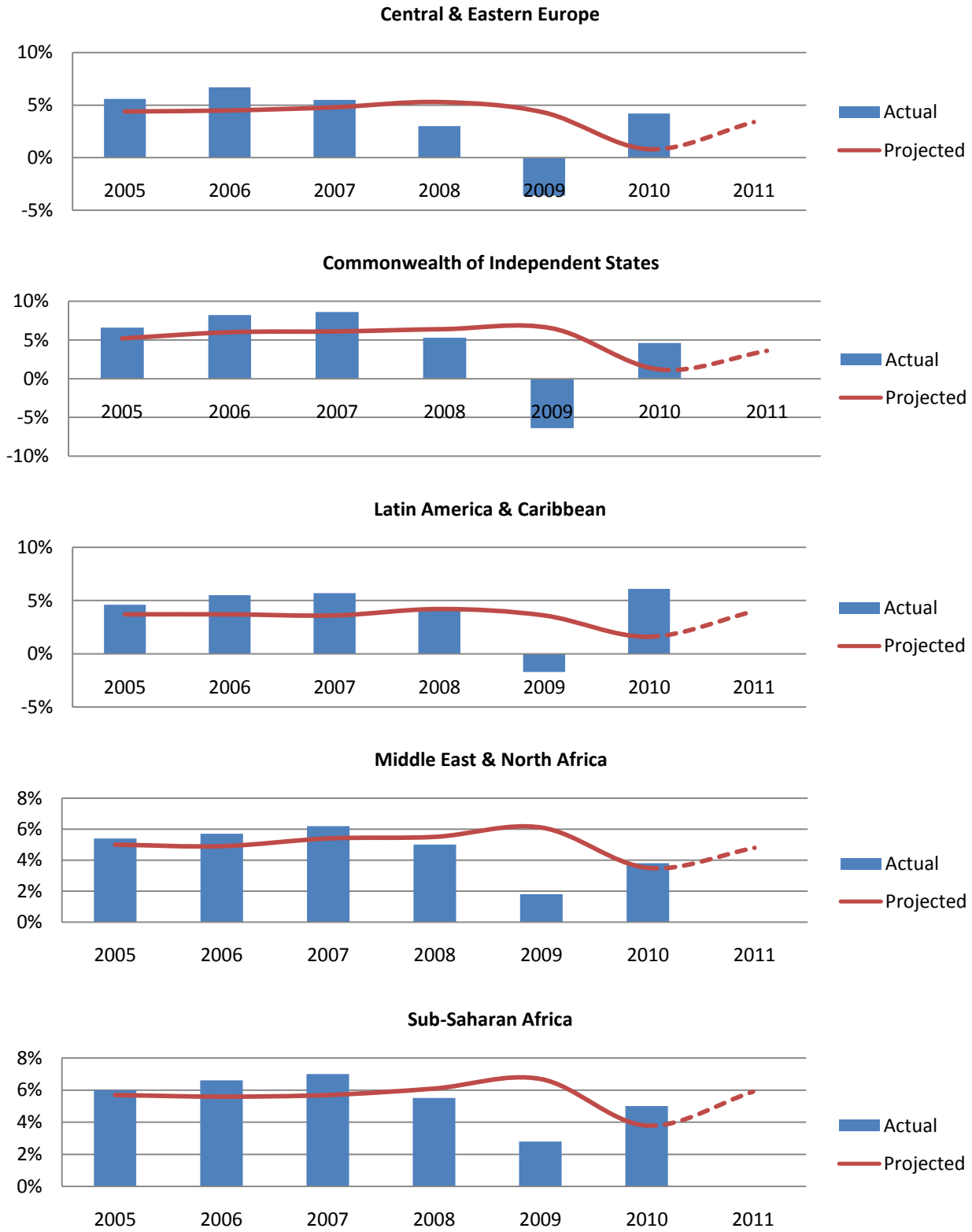
Source: World Bank, Global Economic Monitor database.

Figure 4a: Regional Growth Rates



Source: International Monetary Fund, World Economic Outlook.

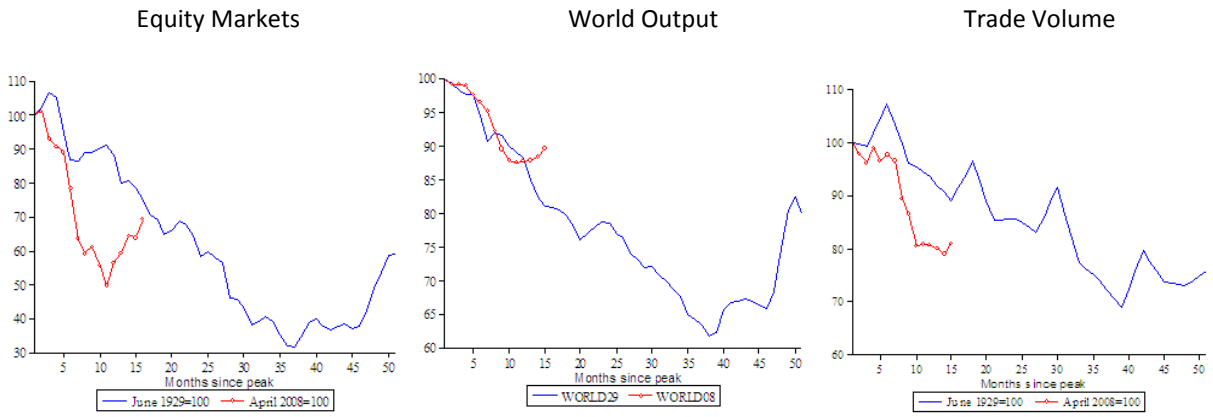
Figure 4b: Regional Growth Rates, Developing World



Source: International Monetary Fund, World Economic Outlook.

12. By many measures, the impact of the crisis reached proportions never before seen in previous crises in modern history. The fall in GDP, the collapse of world trade, the rise in unemployment, the credit slump that followed and the plummeting of the stock markets were more severe than in any other crisis since World War II (Figure 5).

Figure 5: Comparison of Global Crisis to Great Depression



Source: Eichengreen and O'Rourke (2010).

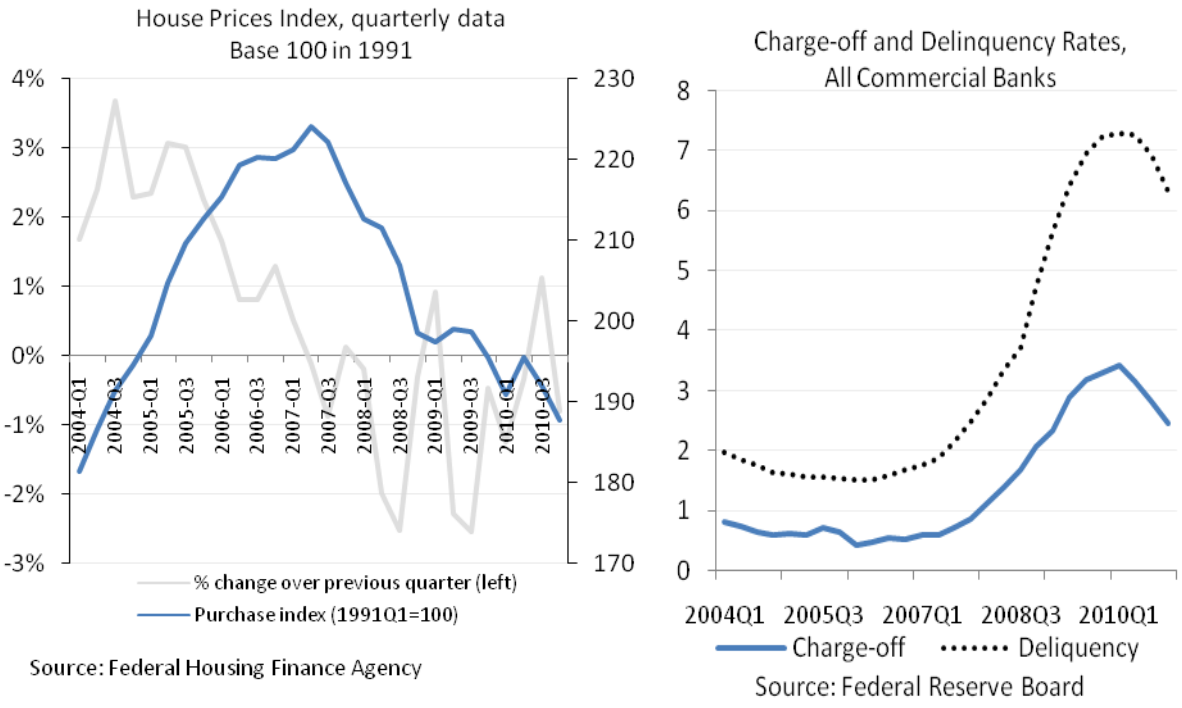
The evolution of the global economic crisis

13. How did the crisis evolve? At the nucleus of the crisis was the burst of the bubble in the U.S. real estate market. While house prices began falling precipitously only in the second quarter of 2007, the growth rate of housing prices had been declining since 2005. In the late 1990s housing prices had begun to rise sharply and increasingly deviated from their fundamentals. Following their peak in April 2006, the bubble began to burst, also as a result of tightening of monetary policy by the Federal Reserve (Figure 6). With signs that the incessant rise in real estate was coming to an end, banks decided to end teaser rates on subprime mortgages and ask borrowers of the so-called "NINJA" loans—i.e., loans that had been made without any declaration of income from the borrower—to start paying off debt. However, as the downturn in house prices intensified, mortgage delinquencies, charge-offs and defaults accelerated (Figure 6). The liquidation of foreclosed housing further accelerated the decline in the real estate market. Banks that had overextended themselves on the housing market and were aware of a housing glut, drastically reduced offering mortgages and the housing boom ended. In a downward spiral, the decline in prices pushed more and more borrowers with adjustable-rate mortgages to default, thus further endangering the position of banks and other financial institutions that had collected subprime loans securitized through new instruments, in particular Collateralized Debt Obligations (CDO's).[13]

14. The loss of value of CDO's led to large-scale sell-offs of these instruments and of assets that were somehow connected to these defaults.[14] This affected in particular hedge funds that had become highly leveraged, with the riskiest having a debt-to-equity ratio of twenty to one. As a case in point, when in the summer of 2007 the market began to fear that subprime CDO's might lose much, if not most, of their value, two hedge funds run by Bear Stearns, which had invested several billion U.S. dollars of short-term loans into highly illiquid subprime CDO tranches started to lose most of their value. As a result, banks made margin calls and effectively withdrew the short-term financing upon which the hedge funds had relied. The collapse of those two funds portended the fate not only of hundreds of other hedge funds but also of the shadow banking system as a whole—consisting of financial institutions, such as money market mutual funds, mutual funds, and hedge funds, that perform the roles of banks, but are not regulated as such (Roubini and Mihm 2010, p. 91).

[13] See paragraph 74 for detailed discussion of these derivatives.
[14] Lewis (2010).

Figure 6: Housing Price Declines and Mortgage Charge-offs and Delinquency in U.S.



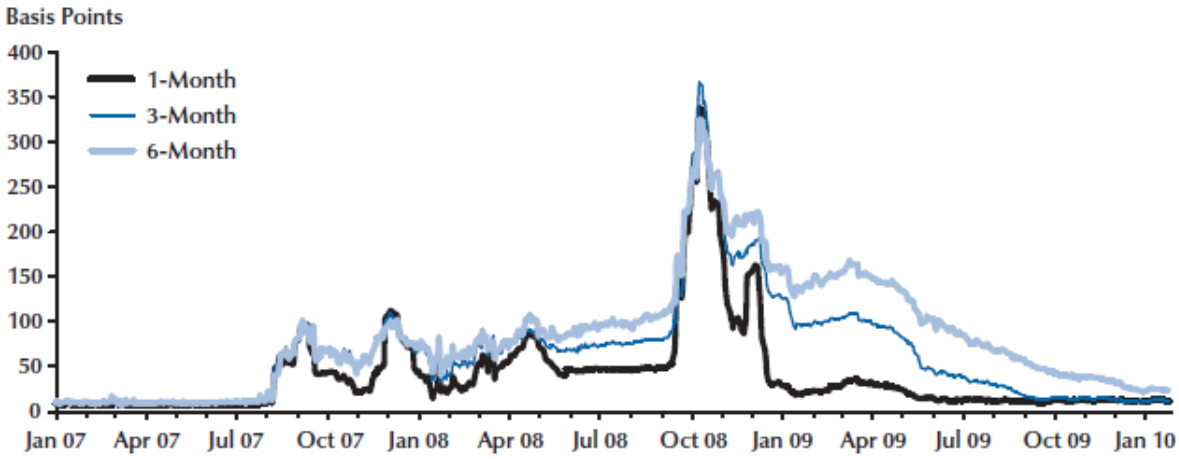
15. The first signs of a serious crisis had already emerged in late 2007, when as a result of growing defaults on mortgages a German and a British bank (IKB Deutsche Industriebank and Northern Rock, respectively) collapsed. In response to these events, the Central Banks of the United States, European Union, Canada and Switzerland had in December 2007 announced a plan to provide at least $90 billion in short-term financing to banks and shortly afterwards the European Central Bank injected $500 billion into the financial system.

16. In March 2008, Bear Stearns filed for bankruptcy and was bought by JPMorgan for less than a tenth of its pre-crisis value. In September 2008, the crisis erupted with full force, when Merrill Lynch, Lehman Brothers, and the insurance companies AIG and HBOS filed for bankruptcy. Lehman Brothers' collapse was the largest bankruptcy in U.S. history. The collapse of Lehman Brothers and other banks and insurance companies happened largely as a result of their exposure to the bursting of the bubble in the real estate market.[15] The banks had a highly leveraged position that was vulnerable to a small decline in housing-related markets.

17. Lehman's fall led to a complete halt of credit between financial institutions, as the uncertainty of their balance sheet positions made lending between them too risky (Figure 7). The sudden halt of intra-bank lending triggered a liquidity crisis as well as bank runs.

[15] Roubini and Mihm (2010).

Figure 7: LIBOR-OIS Spread

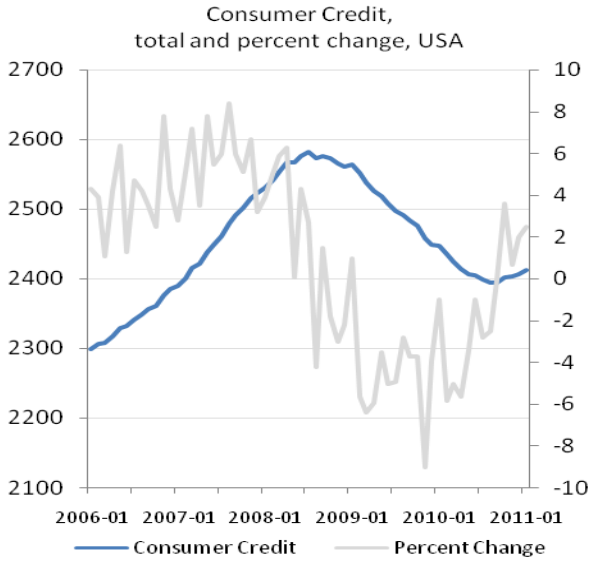


Sources: Bullard (2010), Financial Times, and Reuters. The LIBOR-OIS Spread (London Interbank Offer Rate - overnight indexed swap) measures the risk of default associated with lending to other banks.

18. The U.S. government quickly responded through a $700 billion bank bailout to rescue the financial sector from complete collapse as the leading financial institutions (banks, insurance companies, pension funds) faced bankruptcy. Under the Troubled Assets Relief Program (TARP) the US Treasury had the permission to insure or purchase up to $700 billion of commercial or residential mortgage securities or any other financial instrument related to them to promote financial market stability and encourage banks to resume lending, both between banking institutions and to consumers and businesses. AIG, the largest insurance company, was also saved from a liquidity crisis by an intervention from the Federal Reserve Board. To help financial institutions restore credit, the Fed lowered its effective rate to a nominal rate of almost 0 percent. Shortly before the collapse of Lehman Brothers, the government had already taken over Fannie Mae and Freddie Mac, which were in a difficult position given their operations as sellers of mortgage securities in the secondary mortgage market.

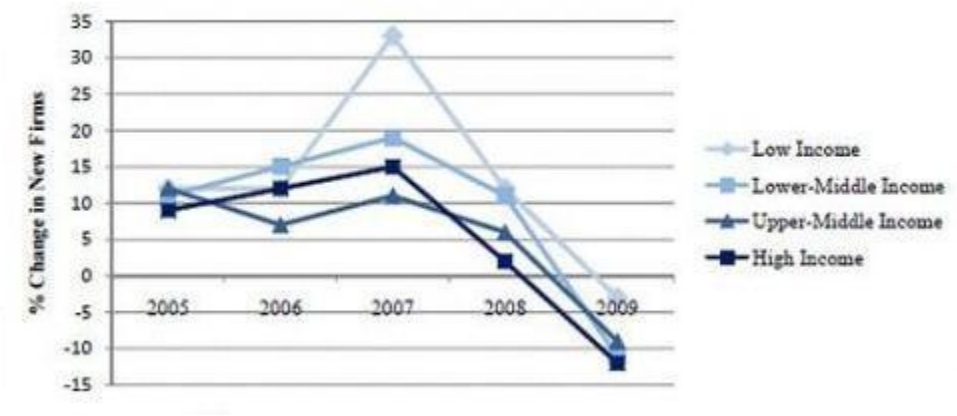
19. The real economy was severely affected by the financial crisis. The recession affected first the financial system and the housing sector, but it quickly spread through the rest of the real economy. Consumer credit, which had been growing steadily during the boom years, fell sharply (Figure 8). Companies that had expansion plans could not raise the capital necessary to finance it. The number of new start-ups in the U.S. and worldwide fell considerably, as lending for new projects became too risky (Figure 9).

Figure 8: U.S. Consumer Credit during the Crisis



Source: International Financial Statistics.

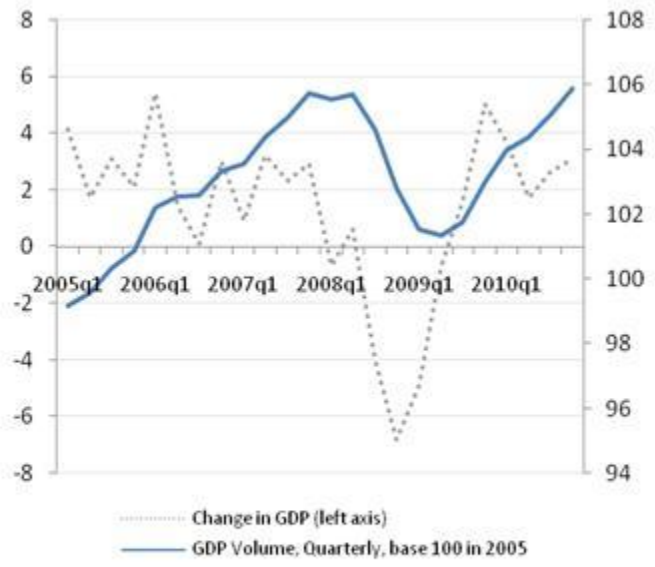
Figure 9: One Year Growth in New Firms



Source: Klapper and Love (2010).

20. The U.S. recession started in December 2007 and lasted for 18 months, when growth began slowly to pick up (Figure 10). The crisis brought about a jump in U.S. gross debt from 62.2 percent of GDP before the crisis to 93.5 percent of GDP in 2010, largely reflecting a sharp downturn in tax revenue.[16]

Figure 10: U.S. GDP During the Crisis

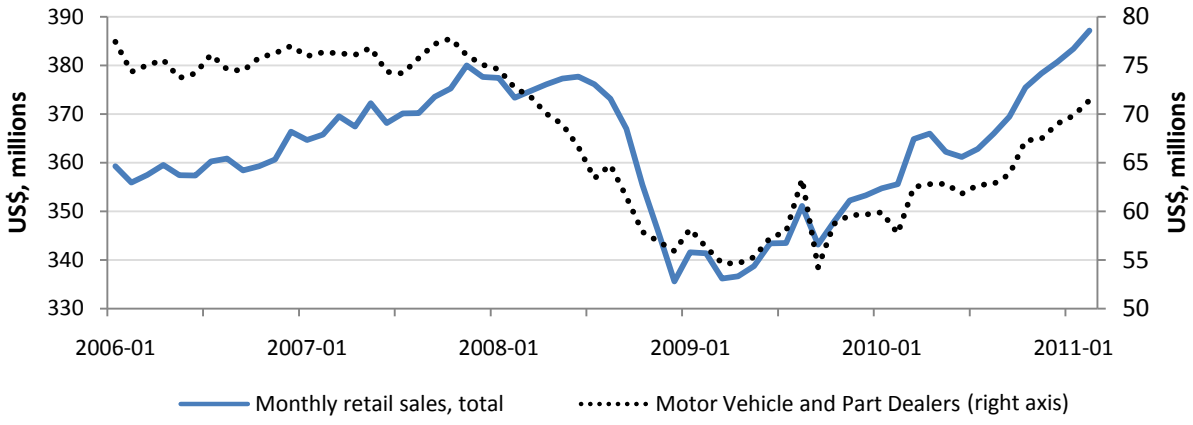


Source: BEA and IFS, International Monetary Funds.
GDP % change based on chained 2005 USD.
Quarterly, Seasonally adjusted annual rates

[16] IMF. 2011 Article IV Consultation with the United States.

21. Demand fell across all sectors, but the decline was larger for goods than for services. Retail sales collapsed as uncertain consumers postponed durable goods purchases and their holidays. The automotive industry observed a sharp fall in demand, which led to large-scale restructuring, with considerable job losses (Figure 11). Chrysler and General Motors filed for bankruptcy (in May and June 2009, respectively) and the U.S. Treasury rescued the companies by becoming equity shareholders, as part of the $787 billion fiscal stimulus package put in place by the U.S. government.

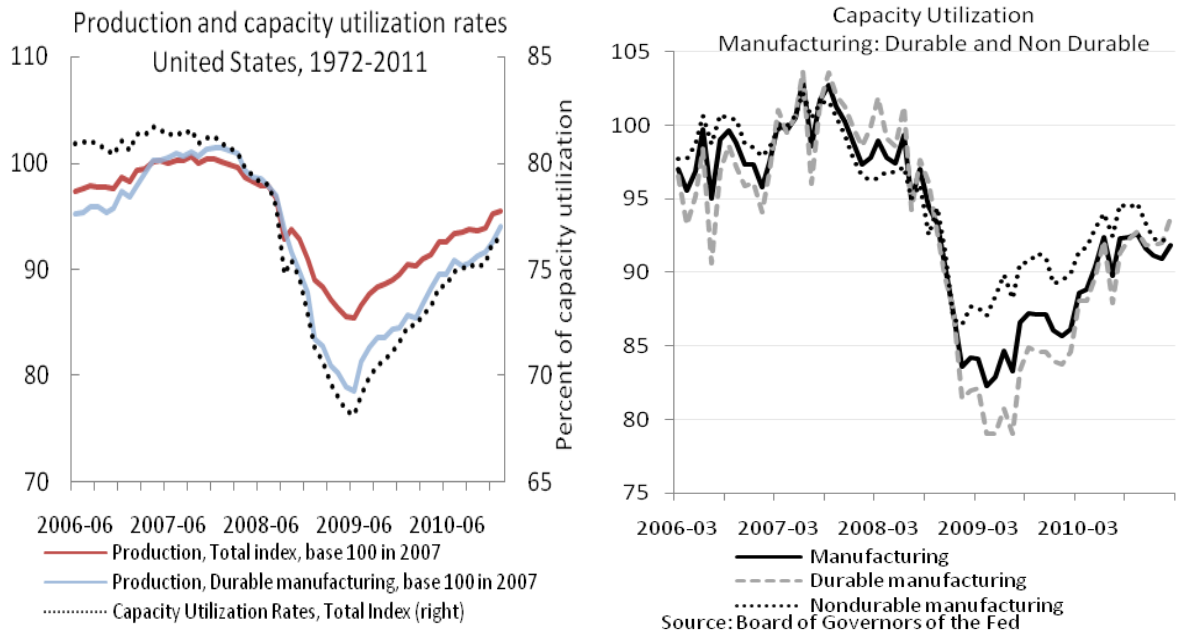
Figure 11: U.S. Monthly Retail Sales



Source: Federal Reserve.

22. Capacity utilization rates fell sharply during the crisis. Starting in September 2008, the production and capacity utilization levels for manufacturing declined abruptly (Figure 12). As demand for durable goods collapsed, capacity utilization rates in manufacturing plummeted. The automobile sector was hit particularly hard, as its capacity utilization rates reached historic low levels, below 40 percent. The restructuring of most automobile companies was inevitable given the low levels of capacity utilization and the bankruptcy filing of many of them.

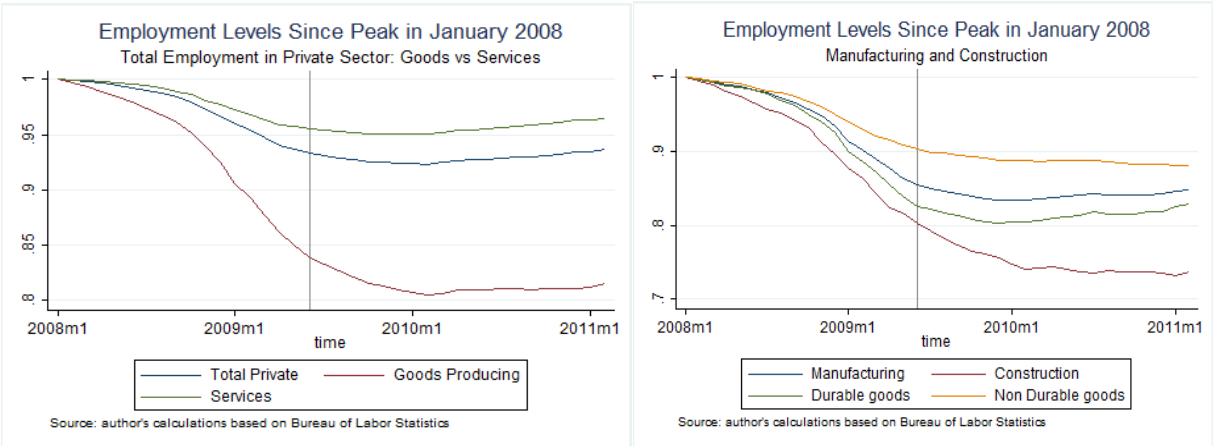
Figure 12: Capacity Utilization



Source: Federal Reserve.

23. Employment levels declined precipitously in the goods-producing sector of the economy, while the services sector was more resilient to the crisis (Figure 13). Job losses in the American economy totaled more than 7 million jobs, almost 7 percent of total U.S. employment. The construction sector employed, at the trough of the crisis, almost 30 percent fewer people than at the beginning of the recession.

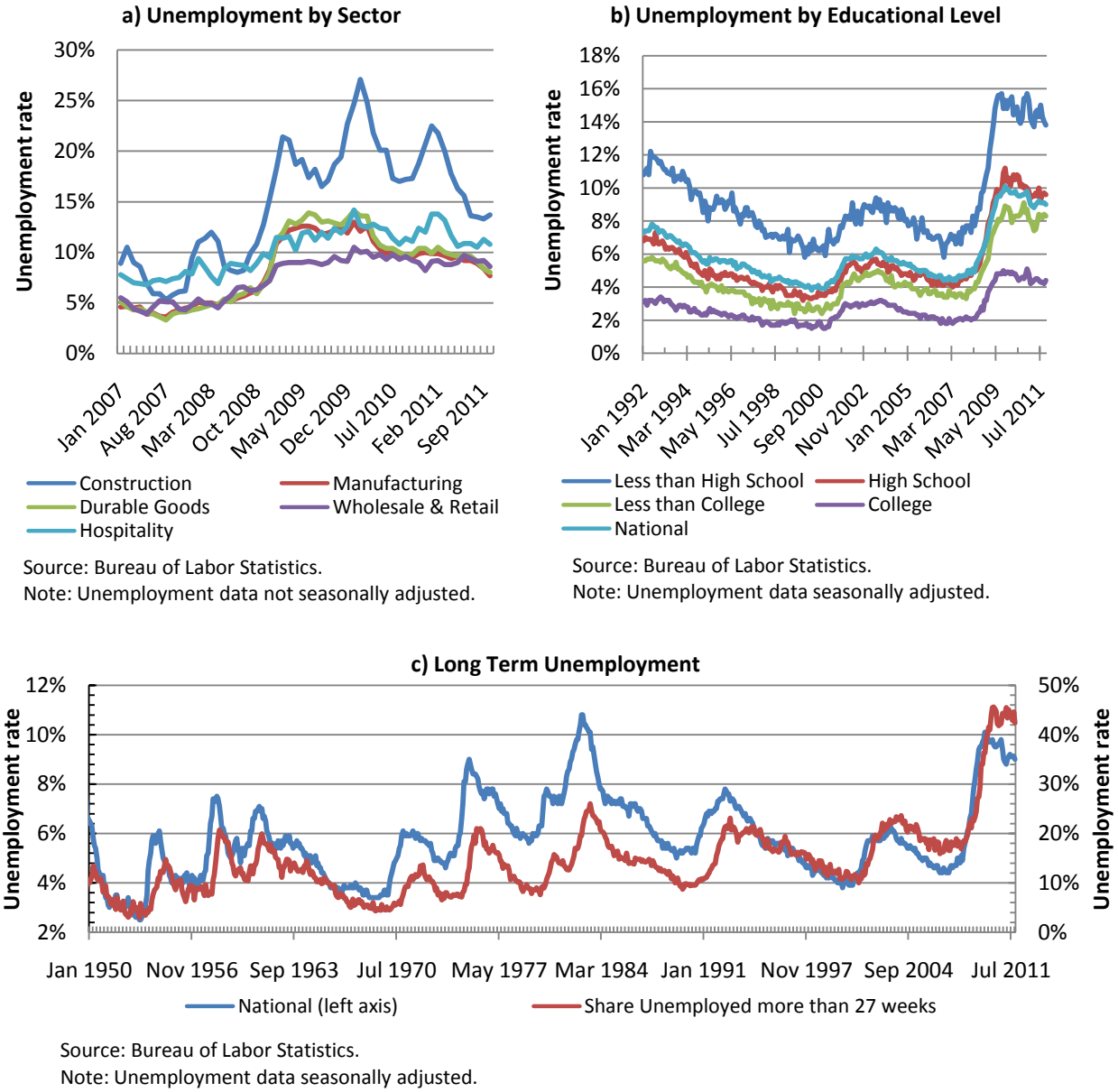
Figure 13: U.S. Employment Levels



24. Unemployment rose nationwide, but its distribution was uneven across sectors, skills and states. The construction and durable goods sectors were the most severely hit. The downturn was

even more drastic in states that had experienced a large housing boom, or in the rust belt where the relative size of manufacturing is important. Unemployment increased more for workers without qualifications, as they were dominating sectors hit by the crisis (construction, leisure and transportation). Average unemployment duration is still increasing, and the share of long-term unemployed has reached unprecedented levels (Figure 14).

Figure 14: U.S. Unemployment Trends



Source: Bureau of Labor Statistics.
Note: Unemployment data not seasonally adjusted.

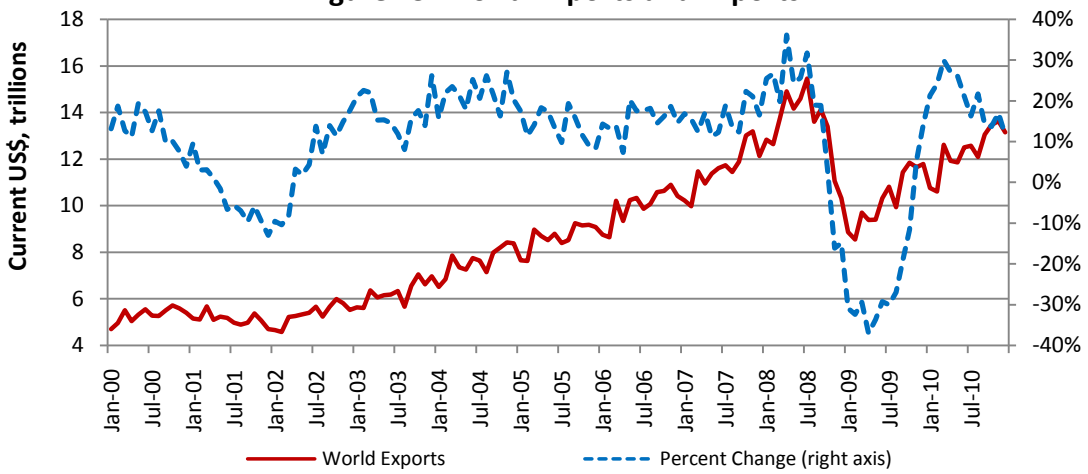
Source: Bureau of Labor Statistics.
Note: Unemployment data seasonally adjusted.

Source: Bureau of Labor Statistics.
Note: Unemployment data seasonally adjusted.

25. The resulting recession in the U.S. quickly spread to other advanced economies as well as to emerging markets and developing countries, triggering fears of a renewed depression. A few

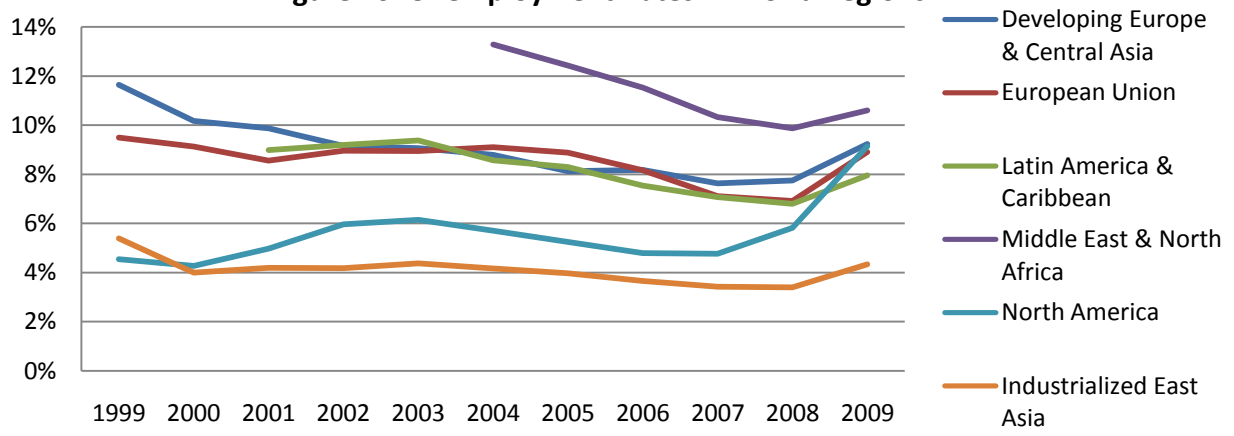
statistics demonstrate the depth of the crisis: in 2009, world GDP fell by 1.9 percent. In high income countries it fell by 3.4 percent (2.6 percent in the US, 5.2 percent in Japan, 4.9 percent in the U.K. and 4.3 percent in the EU). In emerging markets, GDP growth fell to about 0.5 percent, while developing countries maintained a reasonably good growth performance of above 4 percent. World trade in 2009 was around 65 percent lower than in the previous year (see Figure 15). Equity markets collapsed (as shown in Figure 3). Unemployment around the world rose sharply (Figure 16). It surpassed 15 percent in countries like Spain and Greece that already had high levels of unemployment before the crisis (Figure 17).

Figure 15: World Imports and Exports



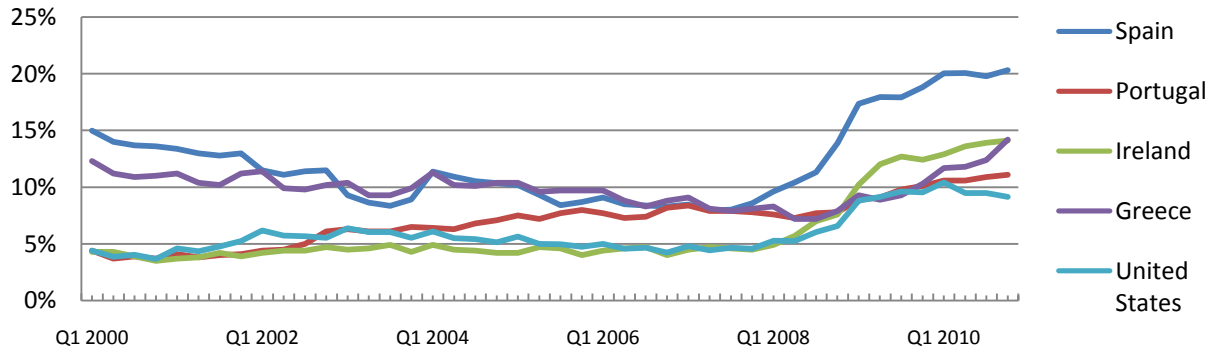
Source: International Monetary Fund, Direction of Trade Statistics.

Figure 16: Unemployment Rates in World Regions



Sources: International Monetary Fund, Middle East and Central Asia Regional Economic Outlook April 2011 and World Economic Outlook Database April 2011; International Labour Organization, Key Indicators of the Labour Market database.

Figure 17: Unemployment Rate in Crisis Economies



Source: International Monetary Fund, International Financial Statistics.

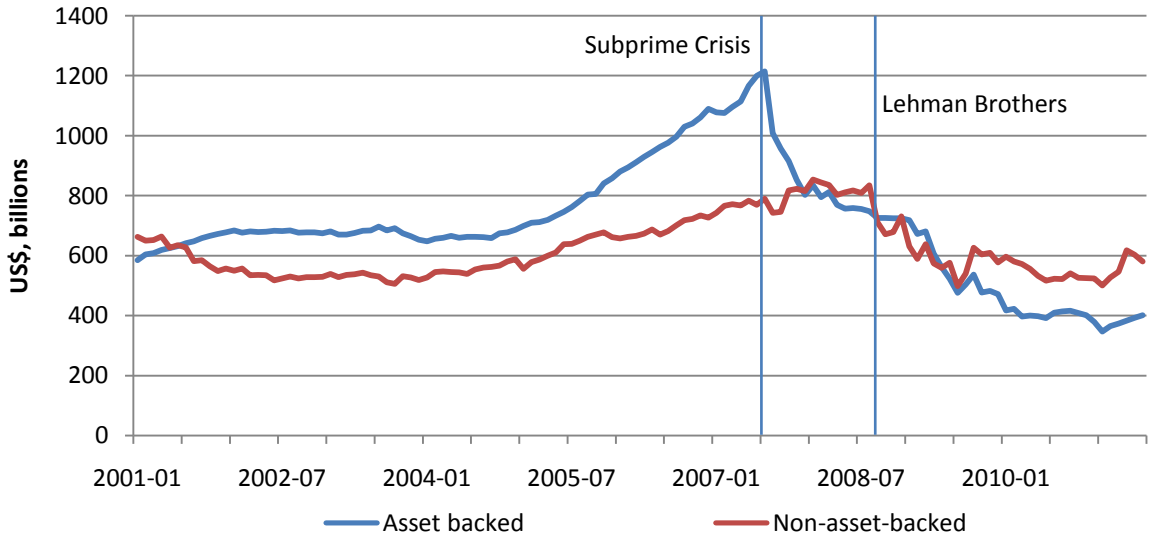
26. The global slowdown in growth heightened vulnerabilities that had already been in place before the crisis. Notably, countries that had their own housing booms, like Ireland and Iceland, or had high fiscal deficits before the crisis, like Greece and Portugal, now teetered on the brink of a sovereign debt crisis and required support from the European Central Bank (ECB) and International Monetary Fund. At present, the fiscal crisis in peripheral Euro countries has already turned into a sovereign debt crisis in the Euro zone, with potentially significant consequences for the world economy as a whole.

The spread of the crisis

27. What were the channels that allowed the crisis to spread? One channel was money markets. The collapse of Lehman Brothers on September 15, 2008, made the short-term debt that it had issued effectively worthless, triggering panic among the various investors and the funds that held it. This panic resulted in a run on the money market funds that provided lending to the commercial paper market, increased perceptions of default risk, and sowed further panic throughout the global financial system (see also Figure 7). Consequently, commercial banks significantly decreased lending rates following concerted efforts by central banks to inject liquidity into the system.

28. In addition, letters of credit and commercial paper to guarantee that goods in transit between trading partners would be paid for when they reached the final destination were no longer available following the collapse of Lehman Brothers—resulting in the freezing of credit markets (Figure 18).[17] As a result, global trade came to a standstill. At the peak of the crisis in early 2009, exports fell—on a year-to-year basis—by 30 percent in China and Germany, and by 37 percent or even 45 percent in Singapore and Japan, respectively.

Figure 18: U.S. Commercial Paper Outstanding



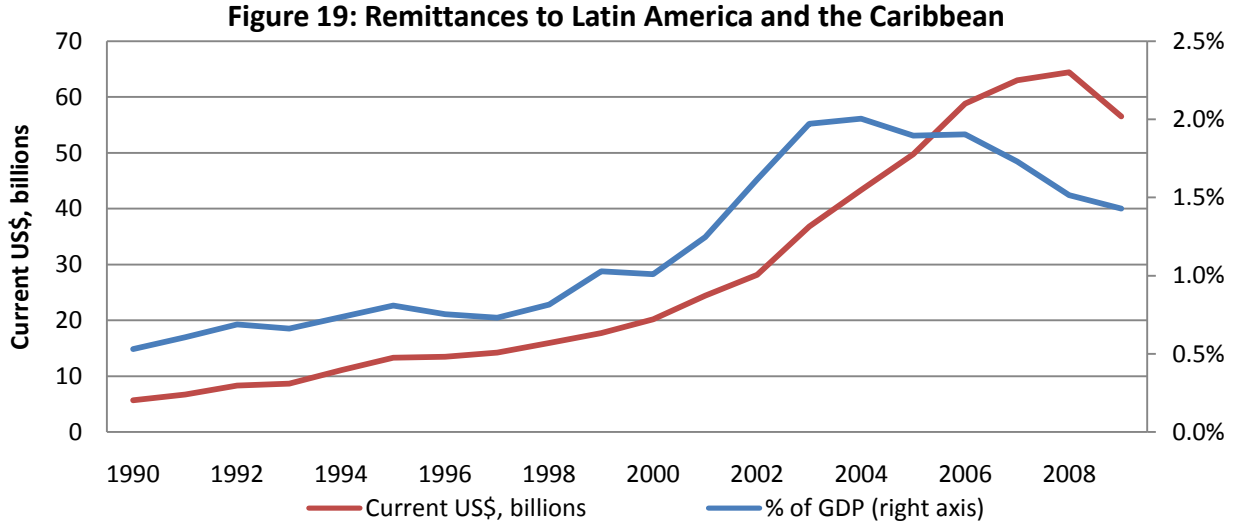
Source: Federal Reserve.

29. Also, while total remittances dropped only marginally, remittances from some groups of workers, in particular migrant workers from Central American countries in the construction

[17] Roubini and Mihm 2010, p. 118.

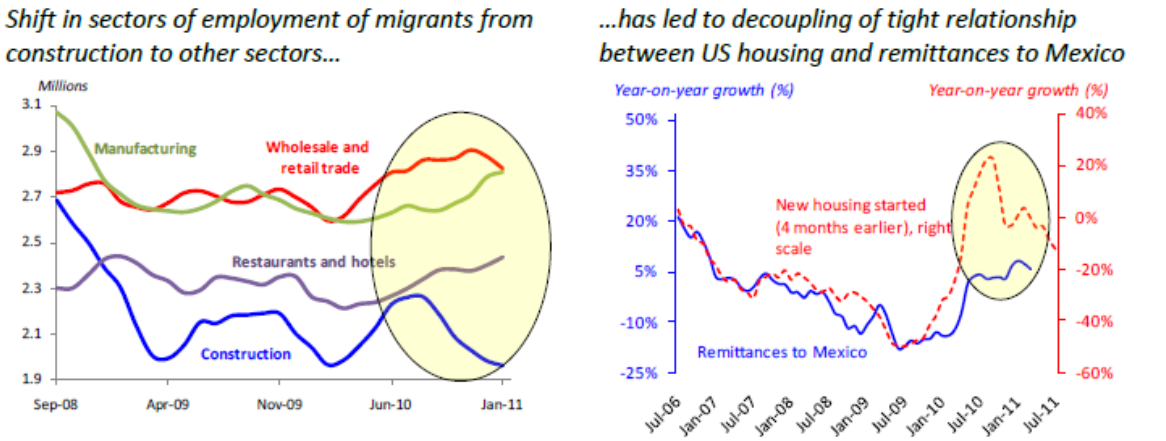
sector in the U.S. – who had been laid off in the wake of the crisis – stopped sending money home, causing a drop-off in aggregate demand in these countries, many of which were highly dependent on inflows (Figure 19). The drop in remittances caused a significant slide in growth in these Central American countries (see also Figure 4b). Furthermore, the tight relationship of the U.S. housing market and remittances to Mexico has become somewhat more tenuous, as workers shifted to other sectors (Figure 20).

Figure 19: Remittances to Latin America and the Caribbean



Source: World Bank staff estimates based on International Monetary Fund balance of payments data, and World Bank and Organization of Economic Co-operation and Development GDP estimates.

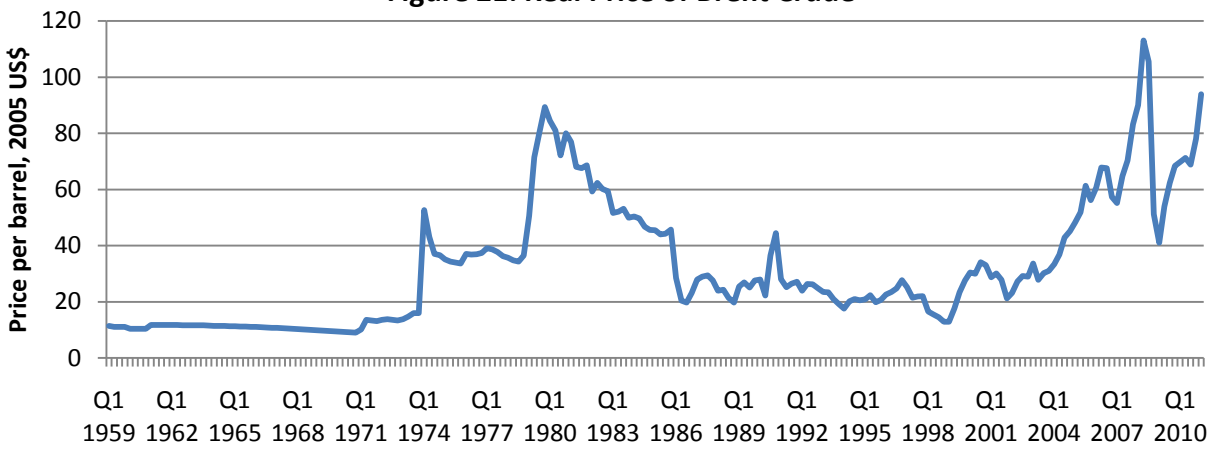
Figure 20: Decoupling of Remittances to Mexico and U.S. Housing



Source: US Current Population Survey, US Census Bureau, Banxico and Migration and Remittances Unit calculations

30. A further factor driving the international contagion was the collapse in international commodity prices, especially oil, as a result of the fall in demand in the advanced economies. This led to a serious fiscal crisis in most oil-exporting countries. As illustrated in Figure 21, oil prices had initially reached a real price, in 2005 dollars, of about $110 per barrel, up from $60 a year earlier. In the run-up to the crisis, the commodity price hikes further compounded the effect of the collapse in the financial sector and pushed these advanced countries further into recession. Loose monetary policy also triggered these commodity price increases, as it diverted demand away from U.S. Treasury bills.[18] In environments with tight commodity markets and declining interest rates, there is a perverse incentive to convert commodities into assets.

Figure 21: Real Price of Brent Crude



Sources: International Monetary Fund, International Financial Statistics; and U.S. Department of Commerce, Bureau of Economic Analysis.

[18] Caballero, Farhi, and Gourinchas (2008).

III. What Was the Root Cause of the Crisis?

31. The root causes of the crisis are subject to considerable debate. The debate largely revolves around the role of global imbalances, as well as the importance of domestic versus international factors in the emergence of the U.S. housing bubble. This section tries to structure the two main competing hypotheses and assess supporting evidence.

32. All attempts to explain the global financial crisis center on the burst of the housing bubble in the United States and differ on the role played by global imbalances in its genesis and their cause. The first hypothesis argues that the global imbalances were brought about by economic policies of East Asian economies, including their export-led growth strategy, the accumulation of international reserves driven by a self-insurance motive and the undervaluation of the Chinese exchange rate. The argument for the export-led growth strategy holds that East Asian countries' systematic promotion of exports through a variety of macroeconomic and microeconomic policies, including dumping, was crucial in creating the global imbalances. The self-insurance motive hypothesis argues that the desire of East Asian countries to accumulate international reserves as a protection against a repeat of their balance of payments crises in 1998 – in which many countries were forced to request assistance from the International Monetary Fund – was a critical factor in creating the current account surpluses. Lastly, the perception that the Chinese authorities were maintaining an artificially low level of the RMB and thereby supporting the country's export competitiveness has been repeatedly mentioned as a key factor behind China's rising trade surplus and global imbalances. All three types of policies were credited with creating the global savings glut, which in turn was regarded as the key condition bringing about low world interest rates, unbridled growth in the financial sector and ultimately the housing bubble whose burst triggered the global financial crisis.

33. The second hypothesis argues that the emergence of the housing bubble in the U.S. was primarily homemade, reflecting the expansion of the mortgage market to low-income segments of the population, the loose stance of monetary policy following the burst of the "dot-com" bubble, and failures in the regulation, incentive, design and structure of the mortgage and financial markets, including the rise of a shadow banking system largely outside the purview of bank regulators (e.g., Roubini and Mihm 2010).[19, 20] The overconsumption of households made possible by the wealth effect resulting from the housing bubble on the one hand and the public debts brought about by the fiscal policy of the United States as a result of the Iraq and

[19] Laibson and Mollerstrom (2010).

[20] For a similar view, see also Obstfeld and Rogoff (2010) who find that both global imbalances and the financial crisis originate primarily in economic policies followed in a number of countries in the 2000s (including in the United States) and in distortions that influenced the transmission of these policies through U.S. and ultimately through global financial markets. Specifically, they argue that it was the interaction among the Fed's monetary stance, global real interest rates, credit market distortions, and financial innovation that created the toxic mix of conditions making the U.S. the epicenter of the global financial crisis.

Afghanistan wars and the Bush tax cuts on the other hand led to large current account deficits in the U.S. These deficits could be financed because of the U.S. dollar's reserve currency status. This hypothesis essentially attributes the crisis to a range of policies pursued by the United States (monetary, fiscal, housing) that encouraged unsustainable overconsumption in the United States, triggering global imbalances and catalyzing the creation of the real estate bubble. The following section analyzes each of these hypotheses in detail.

III.1 Hypothesis I: Global Imbalances Led to the Housing Bubble and the Global Financial Crisis

Policies of East Asian countries

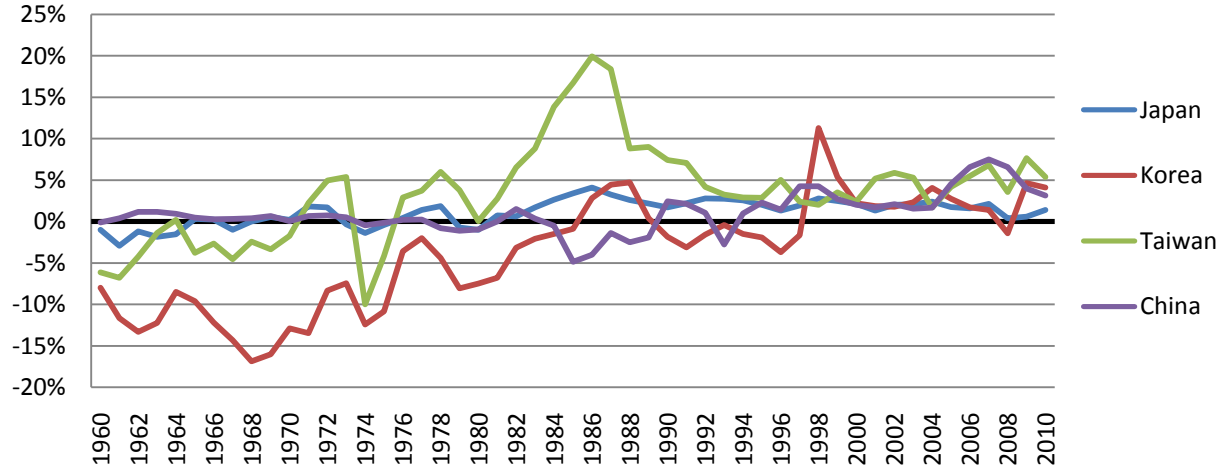
34. As mentioned above, three types of policy choices of East Asian countries have been proposed as causes of global imbalances: (i) East Asian economies' export-led growth strategy[21]; (ii) the self-insurance motivation for foreign currency reserve accumulation after the East Asian financial crisis[22]; and (iii) China's exchange rate policy[23]. All three policies have in common that they create artificially high trade and current account surpluses in East Asian countries: the export-led growth strategy through microeconomic and macroeconomic policies aimed at increasing exports; the self-insurance argument as a result of the deliberate accumulation of international reserves by the Central Bank; and China's exchange rate policy by maintaining the exchange rate of the RMB to the U.S. dollar at an artificially low level. An export-led growth strategy has been pursued by the East Asian economies at least since the 1960s. If this hypothesis was true, it should have caused trade surpluses from the time the strategy was pursued and should have caused other countries competing with East Asian economies' exports to reduce their trade surplus, possibly even resulting in trade deficits. If the self-insurance argument as a key explanation for global imbalances was accurate, global imbalances should be primarily the result of a rise in trade surpluses of countries that have accumulated reserves for the purpose of self-insurance and countries that do not have to be concerned about a balance of payments crisis because their currency is a reserve currency should not see a marked rise in their trade surpluses. Lastly, if China's exchange rate policy is to blame for global imbalances, the evolution of its external surplus should be correlated with changes in its exchange rate. Moreover, other developing countries competing with China's exports should have reduced their trade surplus or even encountered trade deficits.

35. **East Asian economies' export-led growth strategy**: Indeed, the trade surpluses in East Asian economies have increased dramatically in recent years. However, the East Asian economies had already adopted an export-led growth strategy since the 1960s. In fact, a sustainable export-led growth strategy is not based upon targeting an ever-expanding trade surplus, but rather on pursuing a continuously greater integration with international markets that leads to an expansion of both exports and imports, generating higher quality jobs in the tradable sector than before. Given that this type of strategy has been pursued for decades and led to a

[21] Klein and Cukier (2009) exemplifies this argument.
[22] Aizenman (2008) and Aizenman and Lee (2008) provide evidence of self-insurance motives in East Asia. Ben-Bassat and Gottlieb (1992) also supports this viewpoint with a general model tested with Israeli data.
[23] Goldstein and Lardy (2009) offers a review of this viewpoint and argues that a 40 percent appreciation could eliminate China's global current account surplus. Jeanne (2011) presents a model in which savings and capital controls are used to undervalue the real exchange rate.

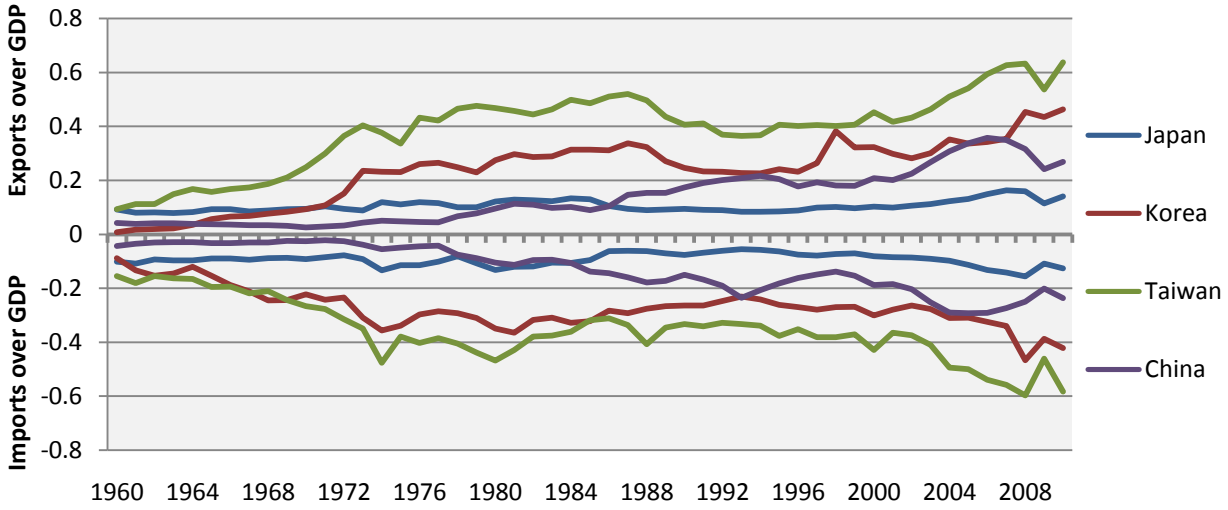
secular increase in *both* exports and imports, it cannot possibly have been the root cause of large global imbalances in 2000 and onwards (Figures 22 and 23).

Figure 22: Ratio of Trade Balance to GDP in Asian countries



Sources: International Monetary Fund, World Economic Outlook database; Organization for Economic Co-operation and Development National Accounts data files; Taiwan Statistical Databook; and World Bank national accounts data.

Figure 23: Decomposition of Ratio of Trade Balance over GDP

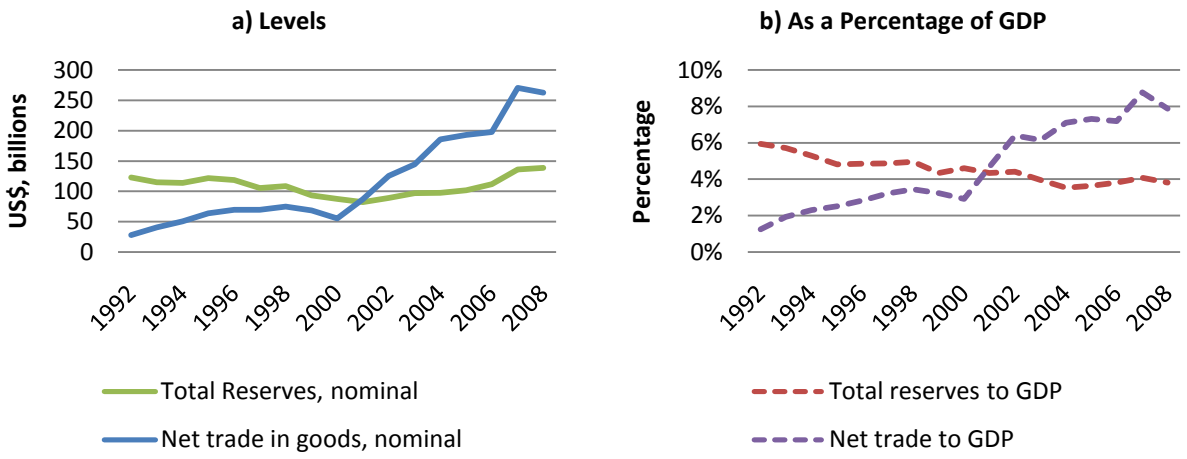


Sources: International Monetary Fund, World Economic Outlook database; Organization for Economic Co-operation and Development National Accounts data files; Taiwan Statistical Databook; and World Bank national accounts data.

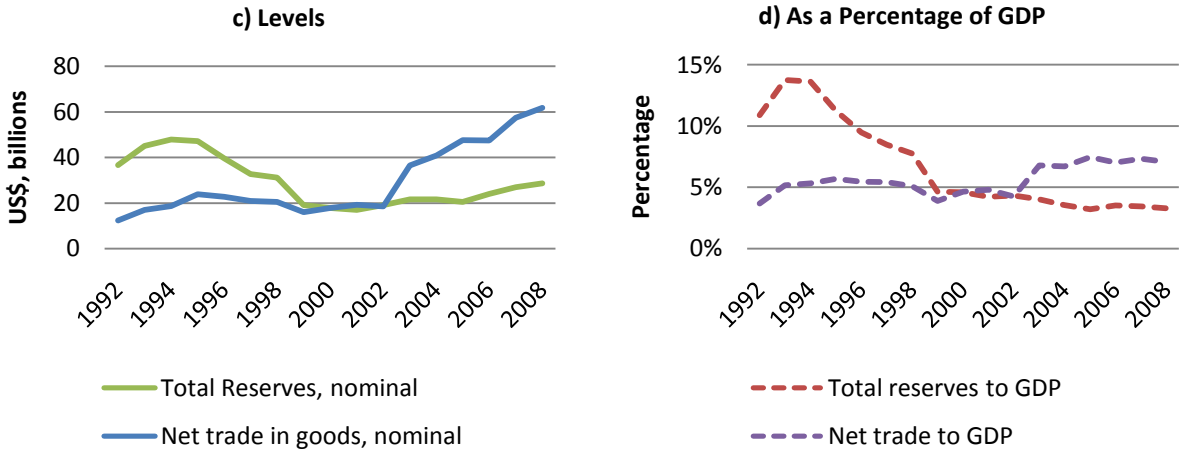
36. **The self-insurance motive**: After the financial crisis in the late 1990s, emerging market economies in East Asia increased their current account surplus substantially and consequently experienced rising levels of international reserves. The self-insurance hypothesis argues that this rise in the international reserve position was primarily motivated by a desire to avoid recourse to international lenders in the case of a further balance of payments crisis, i.e., as an insurance against future contingencies and that these countries deliberately pursued policies to increase trade surpluses with a view to facilitating this reserve accumulation, hence causing global imbalances. However, the self-insurance motive is not a credible argument in that other countries like Germany and the Netherlands that do not have a need for self-insurance, given that their currencies are fully convertible hard currencies, have also substantially increased their trade surpluses and therefore also contributed to rising global imbalances (Figure 24). Attributing the emergence of growing global imbalances to the self-insurance motive would thus not explain the important role in the evolution of these imbalances played by the widening trade surpluses of other economies that do not have a self-insurance motive. Moreover, at more than $3 trillion, China's reserves are now well beyond what could be justified by a self-insurance motive. In fact, Obstfeld and Rogoff (2010) attribute the rise in reserves to hot money inflows as well as foreign direct investment which augmented the impact of growing current account surpluses.

Figure 24: Total Reserves and Net Trade

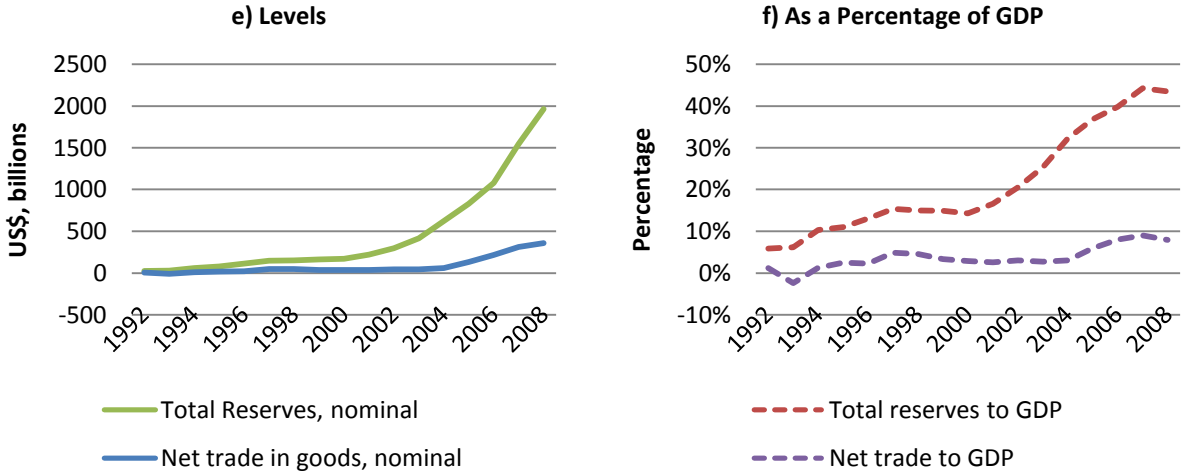
Germany



The Netherlands



China



Source: World Bank, World Development Indicators.

37. **China's exchange rate policy** has been blamed since 2003 as a root cause of global imbalances; the argument is that the Chinese authorities' objective to maintain the renminbi at an artificially low level in order to boost exports and reduce imports was the key reason for the build-up in global imbalances.[24] The bill co-sponsored by Senators Charles Schumer and Lindsey Graham in 2005, which called for a 27.5 percent tariff on all imports from China, is just one example of this type of claim. While the bill was later withdrawn, the sentiment it represents broadly corresponds to public opinion in the United States and other countries. However, those arguments are questionable:

38. First, the extent of over- or under-valuation of the renminbi is subject to considerable debate. Estimates of the undervaluation of the RMB vary to a significant degree and range from 3 percent (Funke and Rahn 2005) to 50 percent (Ferguson and Schularick 2009). They are also highly dependent on the model that is being employed: Most empirical calculations of the undervaluation rely on the theory of purchasing power parity (PPP), the theory that the same good should have the same price in two different countries. Although this is an intuitively appealing theoretical concept, it has proven to be unreliable in reality: prices are consistently lower in developing countries than in industrialized countries. At the same time, capital-intensive goods will be more costly to produce in developing than in developed countries. Some estimates aim at defining what the RMB's value would be by attempting to control for *predictable* divergences from PPP, but even such divergences are subject to a high degree of uncertainty.

39. Another approach is based on the fundamental equilibrium exchange rate method. It aims at assessing the extent to which an exchange rate would have to adjust in order to attain the value of the current account that is in line with its fundamental value.[25] Obviously, estimates will be highly subjective depending on the judgment about the fundamental value of the current account as well as the relationship between a change in the value of the exchange rate and the current account balance. Overall, there seems little consensus on the extent to which the renminbi deviates from its equilibrium value.

40. Moreover, the theoretical underpinnings for an expected exchange rate appreciation of the RMB are unclear: one of the major theoretical foundations for the claim that the RMB is

[24] For example, Paul Krugman (2010a, 2010b), argued that the undervaluation of the renminbi (RMB) caused the large US trade deficit and that the consequent Chinese purchase of US Treasury bonds lowered interest rates in the United States and caused the real estate and equity bubbles that subsequently led to the financial crisis. Low real interest rates also provided investment banks with a strong incentive to structure new and complex financial instruments that during the crisis helped to multiply the effect of failing mortgages throughout the entire financial system. Also Lardy (2005): "Exchange Rate and Monetary Policy in China," Cato Journal.

[25] The FEER was introduced by Williamson (1983): "Exchange Rate System—Policy Analyses in International Economics 5," Institute for International Economics, Washington DC. For an application of the FEER model to China, see Wang (2004): "Exchange Rate Dynamics," in Eswar Prasad, ed.: "China's growth and integration in the World Economy." International Monetary Fund, Occasional Paper 232, Ch.4.

undervalued is the Balassa-Samuelson theorem. The Balassa-Samuelson theorem postulates that rapidly growing economies have a long-run trend of a real appreciation of the exchange rate. A recent paper by Lin, Ju and Liu (2011), however, shows in a multi-sector model, that with large surplus labor in the traditional sector the real exchange rate of a rapidly growing country may not appreciate, until surplus labor has been depleted. Given China's continued abundant labor supply from rural parts of the country, the fact that the exchange rate has not been appreciating significantly is thus not a sign of exchange rate manipulation.

41. More fundamentally, some economists (e.g., McKinnon 2010) argue that the effect of an exchange rate appreciation on the current account may be ambiguous. In his view, the exchange rate plays little role in the adjustment of the current account, as the current account simply reflects savings-investment balances and these balances are determined by structural factors that may not be systematically related to the exchange rate. McKinnon argues that under financial globalization, forcing a creditor country such as China to appreciate its currency is neither necessary nor helpful for reducing its trade surplus. The trade balance is by necessity equal to the difference between savings and investments, but savings and investments are related to macroeconomic balances. Therefore, a focus on the exchange rate as determining savings and investments is misguided. For example, one cannot presume that U.S. net saving will rise when the U.S. dollar is devalued.

42. Moreover, if the undervaluation of the RMB was the reason for the global imbalance, we should see three empirical phenomena:

- When the RMB appreciated by 20 percent in 2005-2008, the U.S. trade deficit with China should have declined.

- The US's trade deficit with other countries competing with China should have declined, causing other countries to reduce their trade surplus.

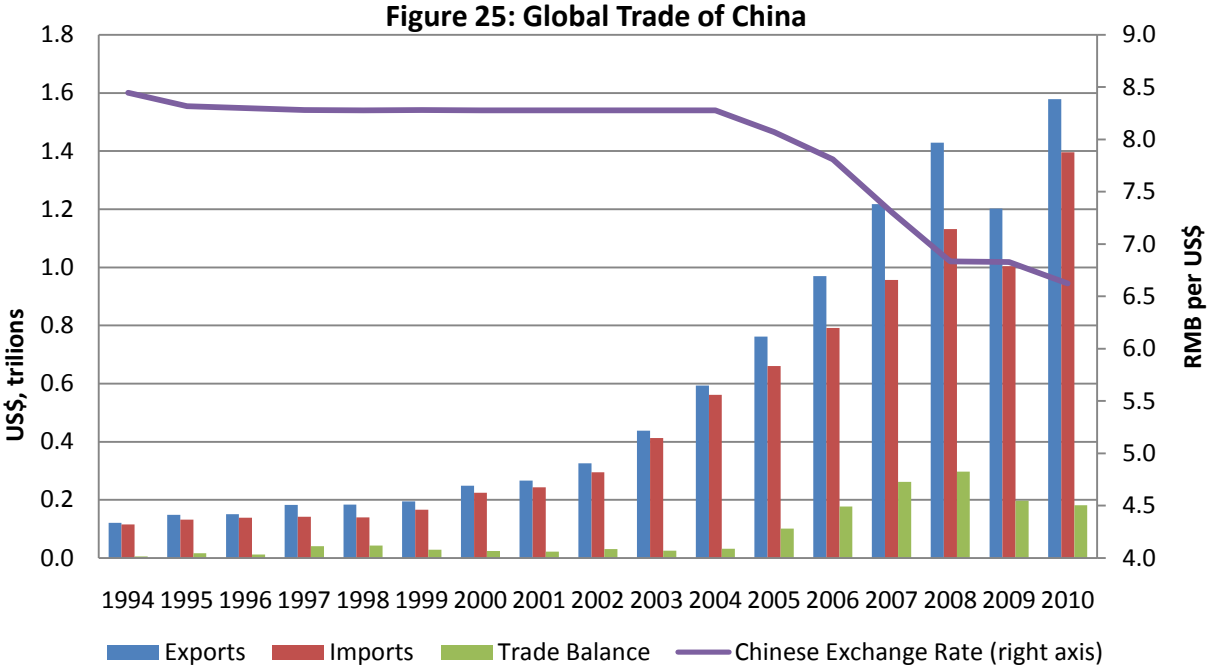
- China's trade surplus with other countries should increase.

43. First, the U.S.-China current account deficit increased constantly until 2007, despite the 20 percent appreciation of the renminbi since 2005 (Figures 25 and 26). Partly, this reflected the fact that prices of U.S. imports remained unchanged—in spite of the appreciation of the RMB—as the large and growing export share of Chinese producers gave them rising market power and allowed them to pass on the rising cost in dollars to wholesalers. [26] At the same time, it would have been even more expensive for the U.S. to import from other countries than from China. In addition, global imbalances already began to grow in 2002, and China has been accused of

[26] Goldstein and Lardy (2008): p. 24.

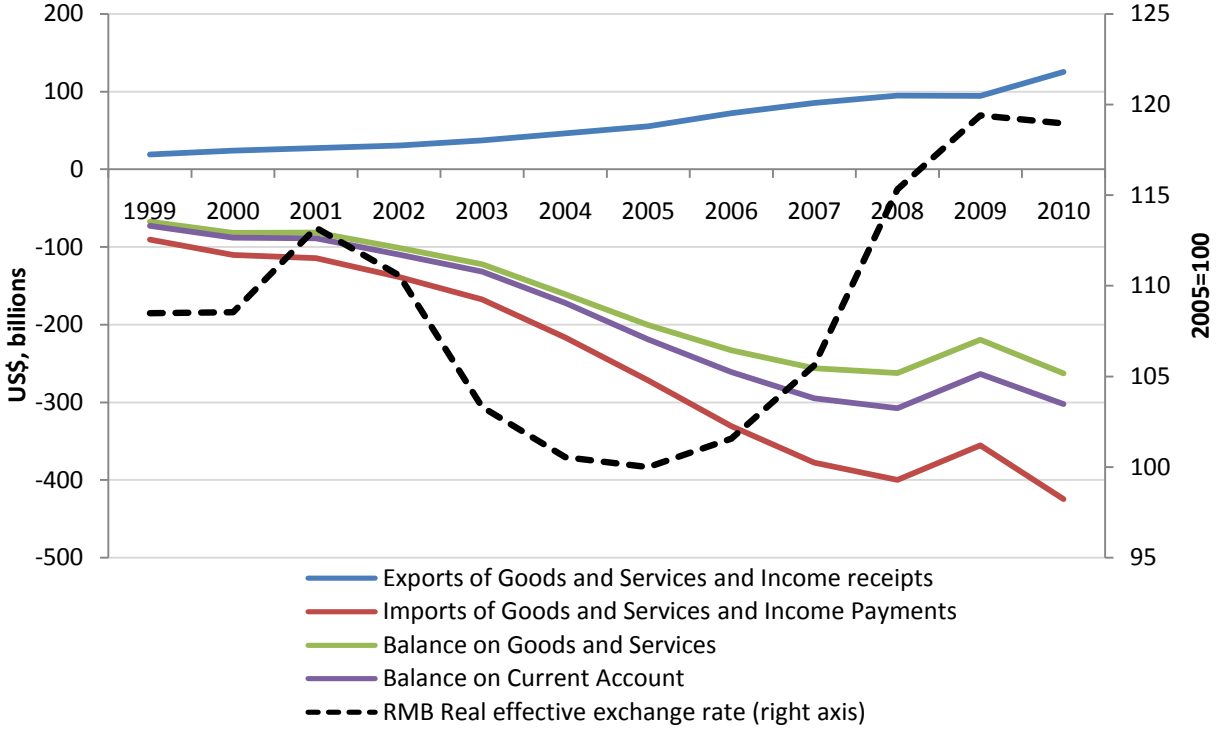
causing the imbalance by sustaining a large undervaluation of its real exchange rate only since 2003. Nevertheless, China's trade surplus did not become large until 2005, and its global trade surplus in 2003 was smaller than that in 1997 and 1998 (Figures 27 and 28). Interestingly, in 1998, at a time when the RMB was still pegged to the U.S. dollar, China's currency was viewed as substantially *over*valued (Lardy 2005).

Figure 25: Global Trade of China



Source: International Monetary Fund, International Financial Statistics.

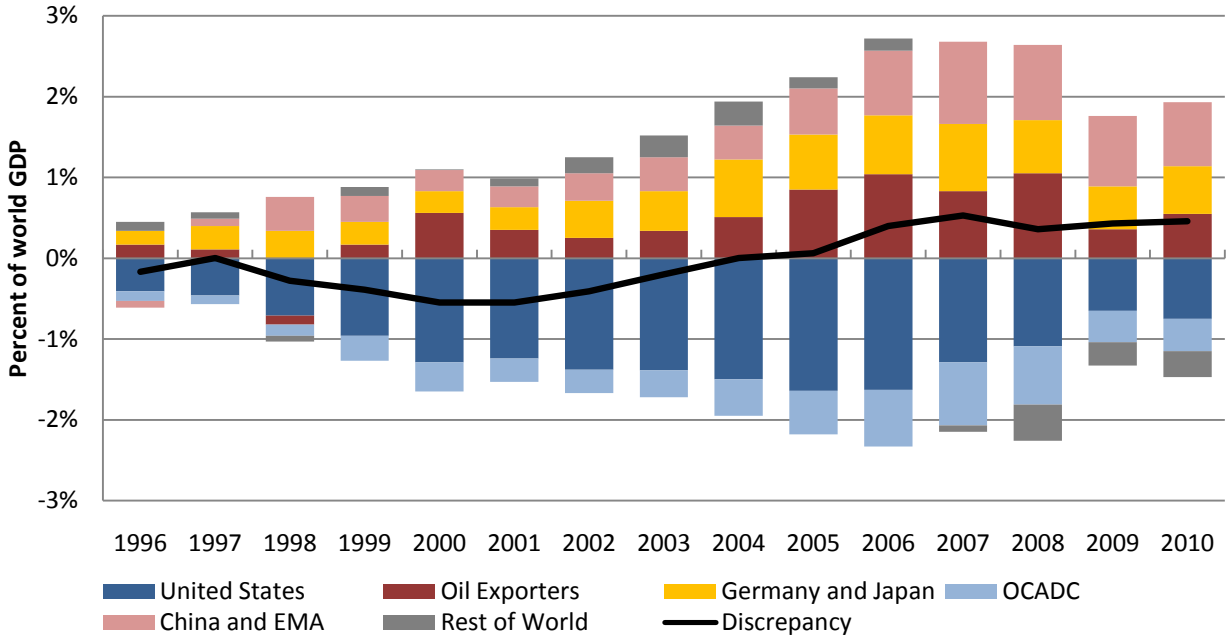
Figure 26: China-US Bilateral Trade and Balance on Current Account



Sources: Bureau of Economic Analysis; IMF, International Financial Statistics

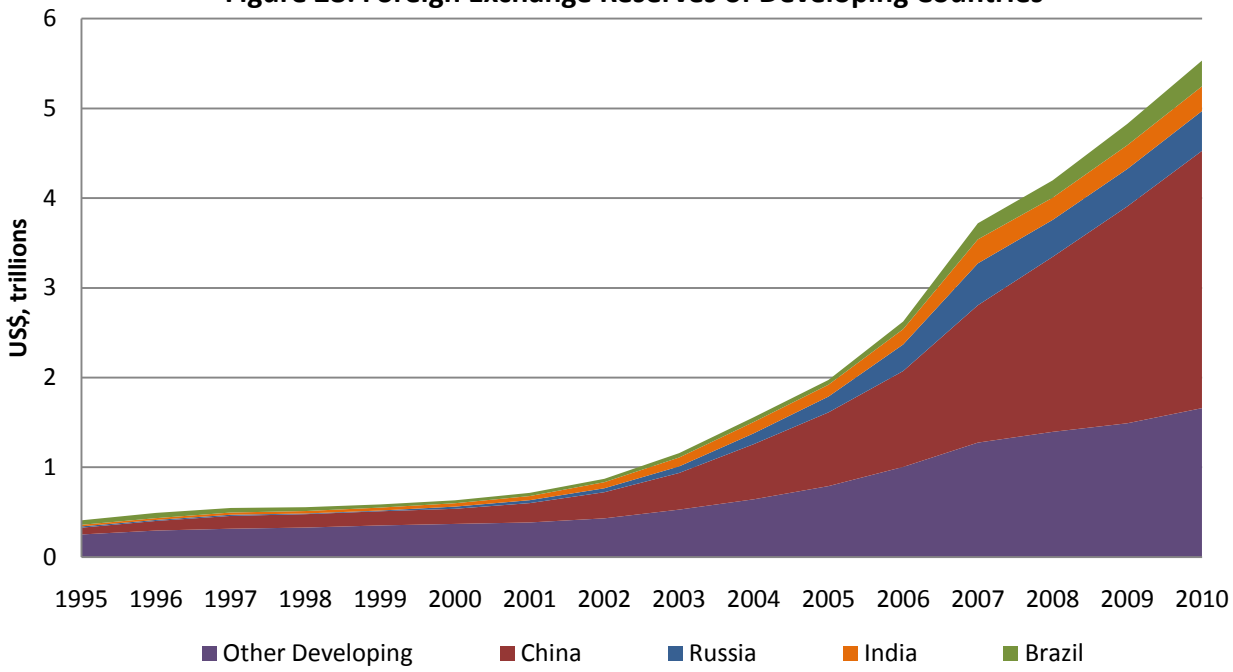
44. Second, if indeed the undervaluation of the RMB was the main reason for the rising U.S. trade deficit and China's trade surplus, the trade deficit of the United States of other countries that compete with China should have declined. However, most other developing countries also increased their current account surpluses and reserves substantially in the same period (see figures 27 and 28 below).

Figure 27: Current Account Global Imbalances



Source: International Monetary Fund, World Economic Outlook.
Note: OCADC is composed of Bulgaria, Croatia, Czech Republic, Estonia, Greece, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain Turkey, and the United Kingdom.; EMA is composed of Hong Kong SAR, China; Indonesia; Korea; Malaysia; Phiippines; SIngapore; Taiwan, China; and Thailand.

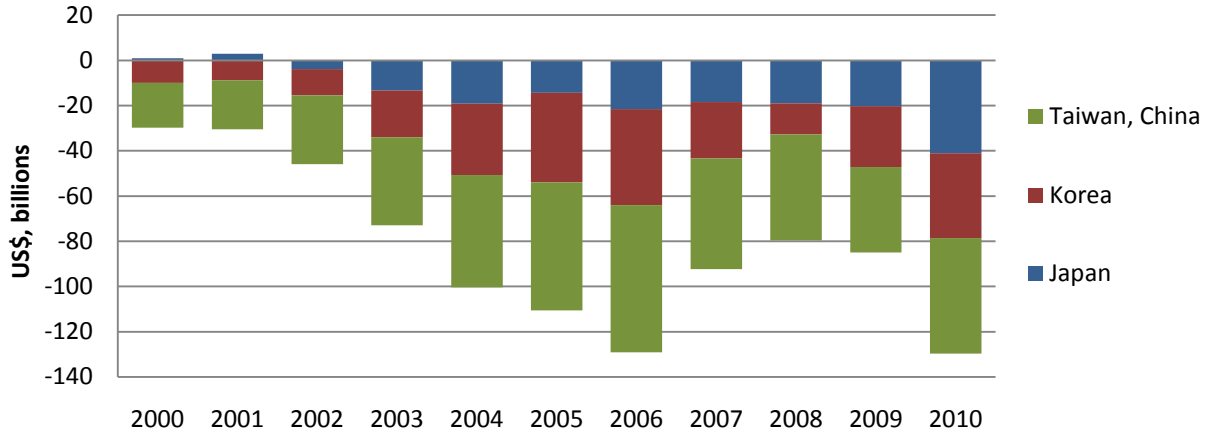
Figure 28: Foreign Exchange Reserves of Developing Countries



Source: World Bank, World Development Indicators.

45. Third, if indeed the RMB undervaluation was the main reason for the trade deficit of the United States and China's trade surplus with other countries – such as Japan; Korea; Taiwan, China; and Germany – China's trade surplus with these countries should have widened. However, to the contrary, China's trade surplus with other advanced countries turned into a deficit (Figure 29).

Figure 29: Chinese Trade Balance with East Asia

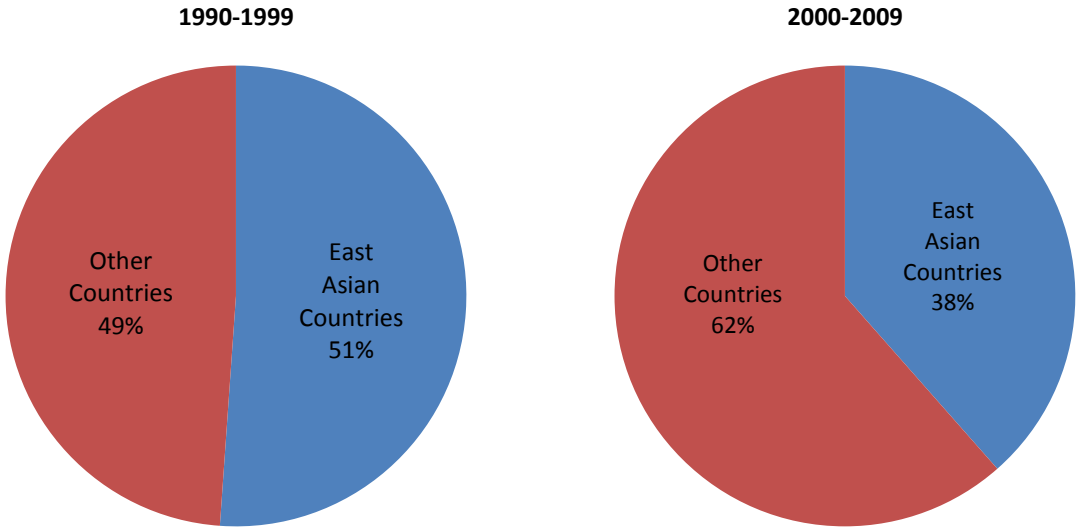


Source: United Nations Comtrade, World Integrated Trade Solution; authors' calculations.

46. The above evidence shows that the exchange rate does not seem to be a significant determining factor for the evolution of the U.S.-China current account deficit. Over the last decade, the rise in U.S. imports from China has been continuous and stable. Those slow trends are not affected by the depreciation of the U.S. dollar-renminbi real effective exchange rate in 2001-2004, or by its appreciation in 2005-2008. Key reasons are structural changes in the economy of China and, related to that, of other Asian economies as well as US monetary and fiscal policies (as discussed in section IV).

47. The above three hypotheses all imply that the East Asian economies are driving the global imbalances. If any of the three or the combination of all three represents the causes of the global imbalance, the share of the US's trade deficits with the East Asian economies in its total deficits should have increased. However, while the United States' trade deficits with China increased substantially, the share of the U.S. trade deficit with East Asian economies as a region actually declined significantly (Figure 30). The above evidence indicates that the three commonly accepted causes may have contributed to but cannot be the main cause of the global imbalances.

Figure 30: Average Share of Trade Deficit of East Asian Countries in U.S. Trade Deficit



Source: United Nations Comtrade, World Integrated Trade Solution.

Global savings glut and interest rates

48. One of the most important channels through which global imbalances are considered to have caused the global economic crisis is through the impact on interest rates (Krugman 2009; Summers 2008). The hypothesis is that the global savings glut put extreme downward pressure on interest rates and thereby catalyzed the real estate boom in many countries and the risky innovations in the financial sector that were crucial to the global contagion of the financial crisis. However, recent research[27] highlights that the global savings glut or "excess savings" may not be related to the downward pressure on world interest rates and the financing of the booms in those countries.

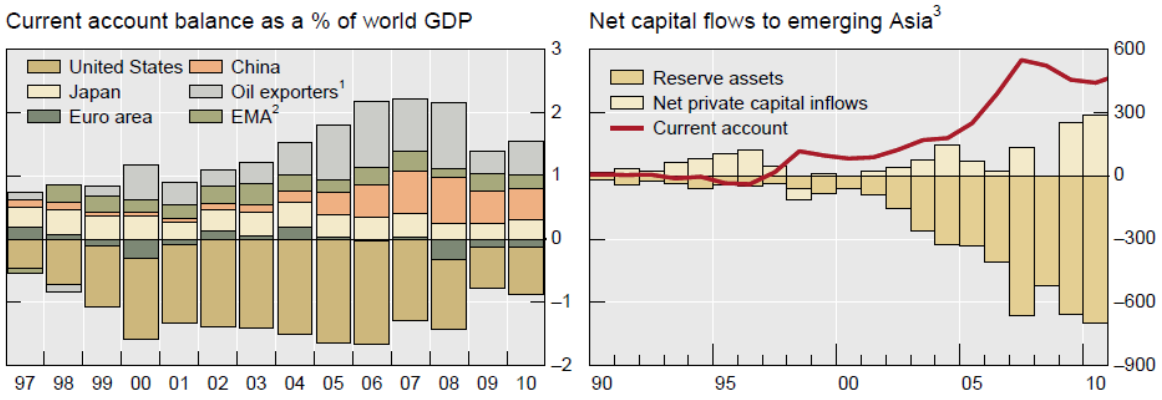
49. A paper by Borio and Disyatat (2011) on the relationship between excess savings associated with current account imbalances and world interest rates concludes that this link may be tenuous. The authors stress that only financial flows can have an impact on world interest rates. However, current accounts and net capital flows say little about financing, as they do not allow statements on the underlying changes in gross flows and their contributions to existing stocks, including the transactions involving trade in financial assets. As a result, current account imbalances provide little information on the role a country plays in international borrowing, lending and financial intermediation, about the degree to which its real investments are financed from abroad and about the impact of cross-border capital flows on domestic conditions.

[27] Borio and Disyatat (2011), Bank for International Settlements. Laibson and Mollerstrom (2010).

50. Also, the link between current account balances and long-term interest rates appears tenuous. For example, U.S. dollar long-term interest rates tended to increase between 2005 and 2007 with no apparent reduction in either the US current account deficit or net capital outflows from surplus countries, such as China (Figure 31). Moreover, the sharp fall in U.S. long-term interest rates since 2007 has taken place against a backdrop of improvements in the U.S. current account deficit, and hence smaller net capital flows (Figure 32).[28]

[28] Obstfeld and Rogoff (2010) also note that data do not support a claim that the proximate cause of the fall in global real interest rates starting in 2000 was a contemporaneous increase in desired global saving, given that global saving fell between 2000 and 2002 by 1.8 percent of world GDP and aggregate global saving rose only later in the decade.

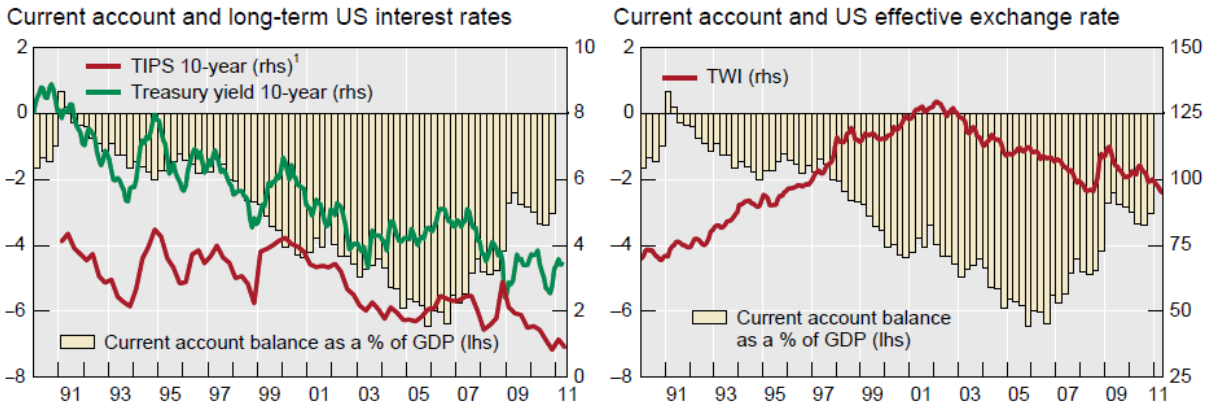
Figure 31: Global Current Account Balance and Net Capital Flows



[1] Algeria, Angola, Azerbaijan, Bahrain, Democratic Republic of Congo, Ecuador, Equatorial Guinea, Gabon, Iran, Kazakhstan, Kuwait, Libya, Nigeria, Norway, Oman, Qatar, Russia, Saudi Arabia, Sudan, Syrian Arabic Republic, Trinidad and Tobago, United Arab Emirates, Venezuela and Yemen. [2] Chinese Taipei, India, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand. [3] EMA countries and China; in billions of US dollars.

Sources: Borio and Disyatat (2011); International Monetary Fund.

Figure 32: U.S. Current Account and Financial Variables

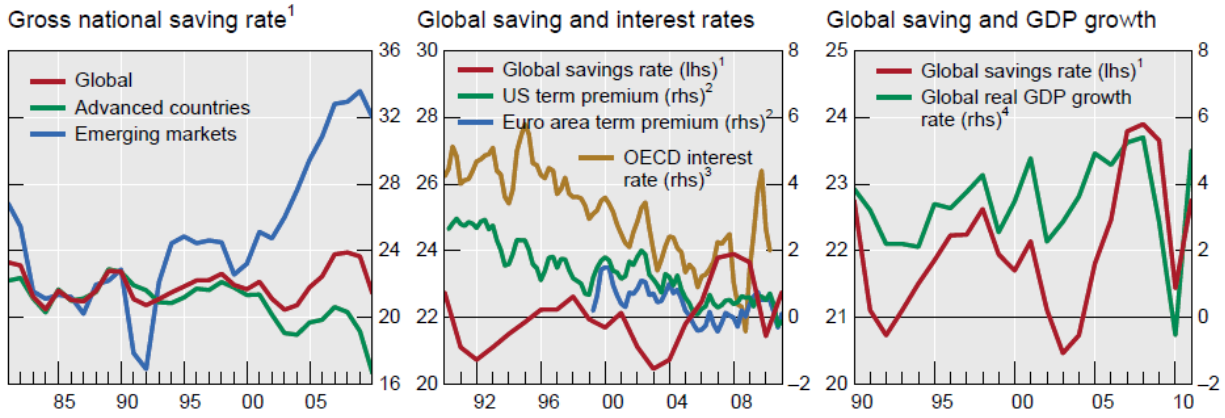


[1] 10-year nominal government yield minus inflation expectations until end-1996.

Sources: Borio and Disyatat (2011); Bloomberg; and International Monetary Fund.

51. Moreover, the link between the U.S. current account deficit and global savings appears to be weak. While the deficit began its trend deterioration in the early 1990s, the world savings rate actually trended downward toward the end of 2003. In contrast, the stabilization and reductions in the U.S. current account deficit since 2006 have occurred against the backdrop of a continued upward drift in emerging market saving rates (Figure 33). [29] Furthermore, there does not seem to be a clear link between the global savings rate and real interest rates or term premia. Both real world long-term interest rates as well as term premia have trended downward irrespective of developments in the global saving rate.

Figure 33: Global Savings Rate, Interest Rates, and GDP Growth



[1] As a percentage of GDP. [2] Nominal 10-year term premia based on zero-coupon real and nominal yields calculated based on estimates from a modified version of the term structure model in P Hördahl and O Tristani, "Inflation risk premia in the term structure of interest rates", BIS Working Papers, no 228, May 2007. [3] 2005 GDP PPP-weighted average of real long-term (mainly 10-year) interest rates for Australia, Canada, Denmark, the euro area, Japan, New Zealand, Norway, Switzerland, the United Kingdom and the United States. [4] Year-on-year growth rates.

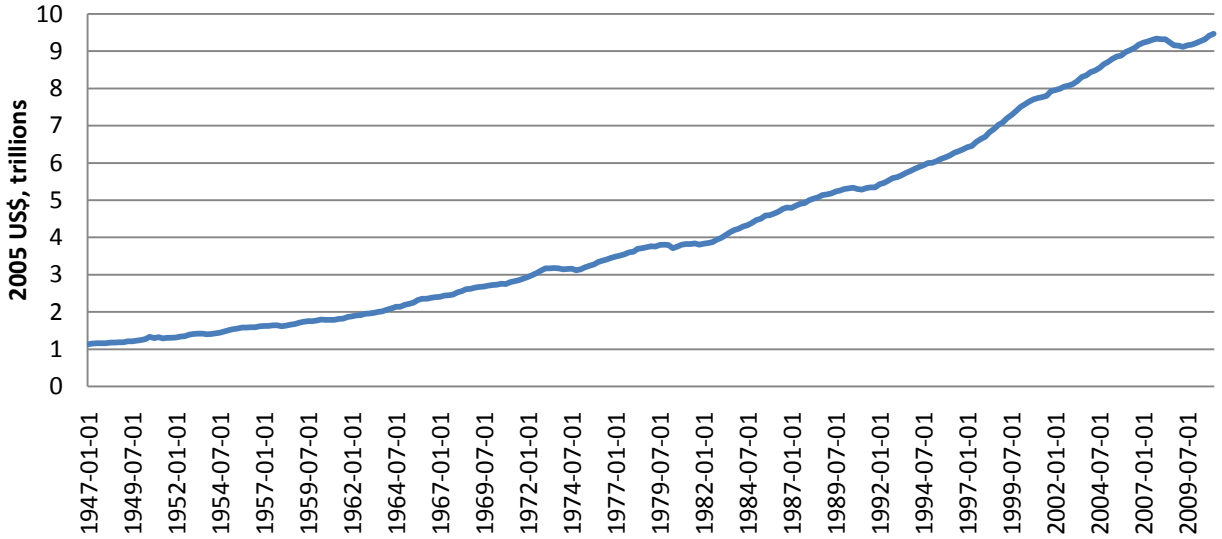
Sources: Borio and Disyatat (2011); International Monetary Fund; and Organization for Economic Co-operation and Development.

52. Doubts on the impact of the global savings glut on the housing bubble in the United States are also raised by Laibson and Mollerstrom (2010). The authors show that global savings rates did not show a robust upward trend during the period of the expansion of the bubble. Moreover, if there had been a global savings glut there should have been a large investment boom—to the tune of at least 4 percent of GDP—as U.S. households should have chosen to invest a substantial share of those funds to help make the interest payments. However, the U.S. investment rate did not rise between 1995 and 2005, and in 2005 ended only 1.6 percentage points higher than in 1995. Moreover, when Bernanke formulated his global savings glut hypothesis, the investment rate was lower than in 1996. In fact, there was no investment boom, but a consumption boom (Figure 34).

[29] The point about falling interest rates coinciding with a falling global savings rate is also made by Laibson and Mollerstrom (2010).

53. To summarize, there is considerable evidence that the global savings glut did not cause the global imbalances.

Figure 34: US Real Consumption Expenditures



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

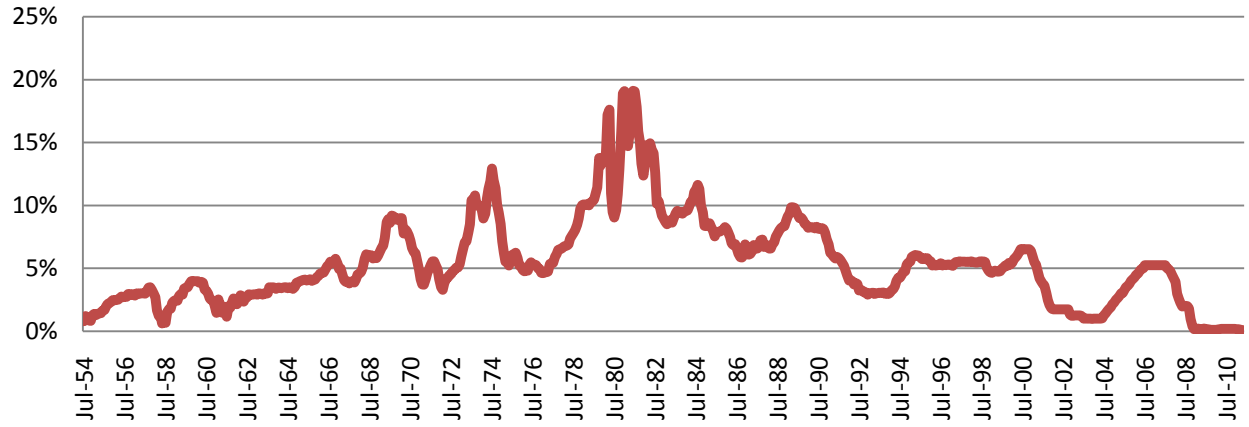
III.2 Hypothesis II: U.S. Policies Led to the Housing Bubble, Global Imbalance and the Global Financial Crisis

54. Instead, it appears that global imbalances reflected policies and structural factors affecting savings in the United States. Lin, Dinh and Im (2010) argue that the housing bubbles were triggered by the Fed's low interest rate policy following the burst of the "dot-com" bubble in 2001 and magnified by the financial deregulation in the 1980s, which will be discussed later. In combination with a range of policies aimed at expanding the availability of mortgages to low-income borrowers in the subprime market, the above policy changes led to excessive risk-taking and higher leverage, resulting in excess liquidity, and "bubbles" in both housing and equity markets in the United States. The wealth effect of these bubbles enabled US households to over-consume, which, together with the public debts arising from the Afghanistan and Iraqi wars and a range of tax cuts, increased the United States' current account deficits. If this hypothesis is correct, a causal link needs to exist between monetary, fiscal and housing policies of the United States, and its large and growing current account imbalance.

55. The Fed's monetary policy had been loose from the 1980s and turned extremely expansionary when the burst of the technology bubble in early 2000 caused a recession. In the run-up to the bubble's burst, and as stock prices continued to rise, the Fed did not intervene. However, when the bubble burst, consumers experienced a significant wealth loss. With

consumption and economic activity falling and the economy heading toward a recession, the U.S. Federal Reserve adopted an aggressive monetary policy to mitigate these effects, reducing the funds rate 27 times from 6.5 percent in March 2001 to 1 percent in June 2003 (see Figure 35 for the evolution of the Federal Funds rate).[30] Testifying before Congress on July 15, 2003, Federal Reserve Chairman Alan Greenspan stated that the economy was not "showing convincing signs of a sustained pickup of growth," such that a further interest rate easing could encourage growth without "ultimately stoking inflationary pressures". Other events in the U.S. also contributed to the Federal Reserve's decision to maintain the low interest rate policy. For instance, after the 9/11 terrorist attacks, U.S. stock markets responded with a sharp decline, raising concerns about the health of the U.S. economy after the terrorist attacks. As a result of the active monetary policy, the U.S. economy recovered quickly and the "dot-com" recession was short-lived.[31] [32]

Figure 35: Long-term Effective Federal Funds Rate



Source: Federal Reserve.

56. The Fed's monetary policy and low interest rates had a significant impact on the housing market. A 2008 paper by the Federal Reserve Bank of St. Louis finds that "monetary policy has significant effects on housing investment and house prices and that easy monetary policy designed to stave off the perceived risks of deflation in 2002-2004 has contributed to a boom in

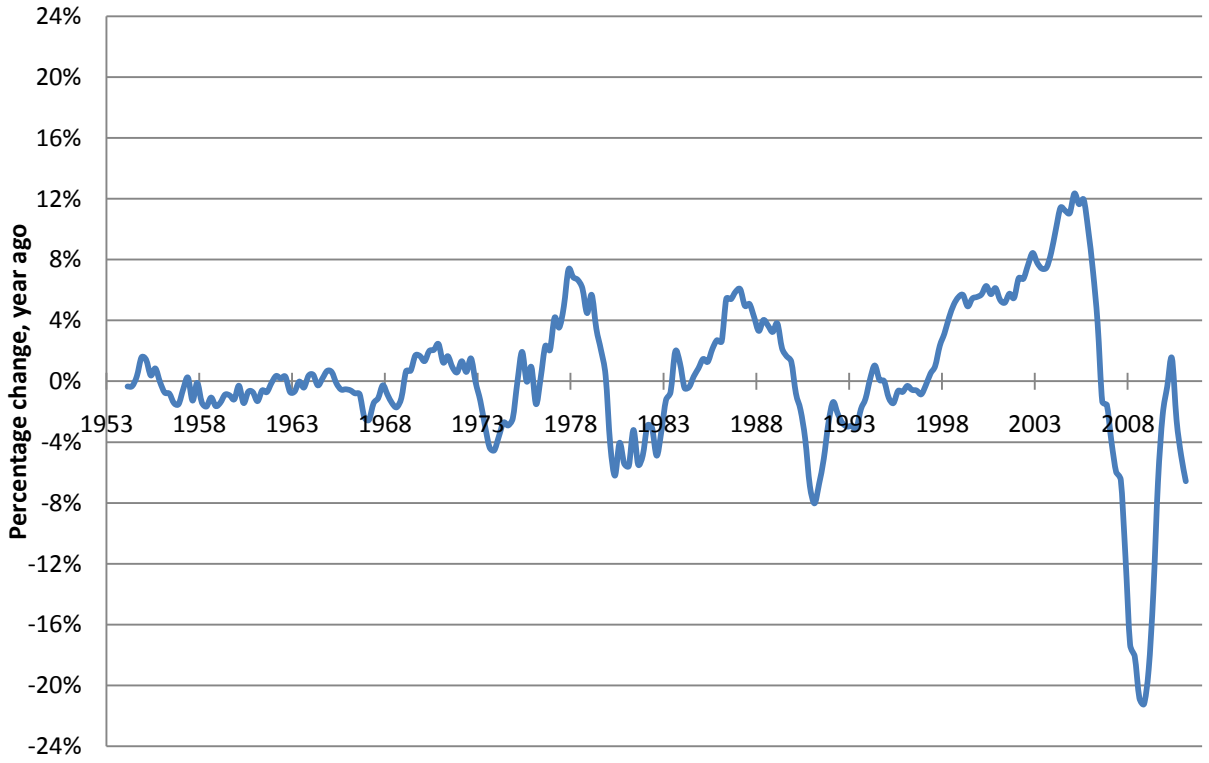
[30] Rajan (2010).

[31] According to the National Bureau of Economic Research, the 2001 recession lasted 8 months from March 2001 to November 2001 (shorter than the average duration of a recession in the US in the post-war era).

[32] The expansionary stance of monetary policy, however, does not explain why real interest rates stayed low after the expansionary monetary policy was scaled back after 2004. One of the factors explaining the persistence of low interest rates may also be the substantial asset reallocation from equities to fixed income instruments during and after the bursting of the tech bubble. This trend was further enhanced by the decision of monetary authorities to invest in US treasuries (e.g., the People's Bank of China, Japan and other countries as shown also in Figure 25). Also, global asset scarcity caused by the Asian Financial Crisis of 1997-98 contributed to a fall in US interest rates. Also, there was a growing consensus that the developed economies had become less risky—as a result of the "Great Moderation"—which also contributed to low interest rates.

the housing market in 2004 and 2005.[33] Specifically, the Fed kept pursuing loose monetary policy, even while it gave assurances to the markets on its willingness to maintain easy monetary conditions and to step in to provide liquidity in case the financial markets had problems, the so-called "Greenspan put."[34] These assurances, along with a range of housing policies discussed in further detail below, helped to boost lending significantly, including to creditors who were barely creditworthy. [35] As noted by Rajan (2010), "Sustained easy monetary policy that is maintained while jobs are still scarce has the effect of increasing risk taking and inflating asset-price bubbles, which again weaken the fabric of the economy over the longer term." Household borrowing went up from 66 percent of GDP in 1997 to 100 percent of GDP a decade later. The protracted period of low short-term policy interest rates in combination with financial innovation also lowered long-term interest rates as a result of low inflationary expectations and a perceived decline in the riskiness of financial assets, and led to a situation of excess liquidity which supported an incipient housing boom since 2002 (Figure 36).

Figure 36: Changes in US Housing Prices by the S&P/Case-Schiller Indices

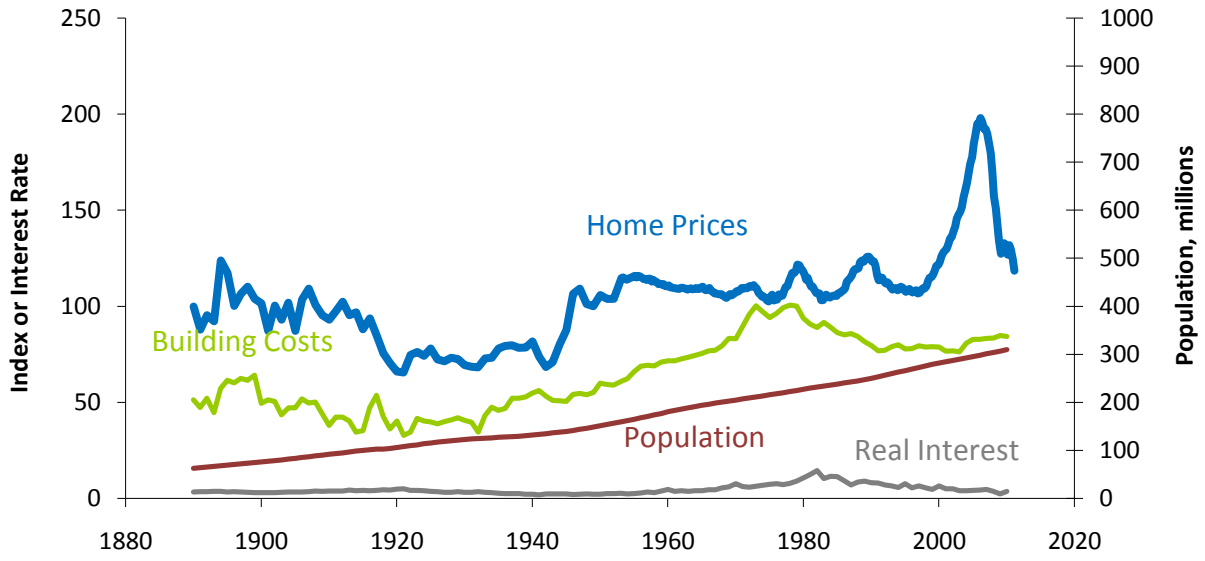


Source: Schiller (2005); authors' calculations.

[33] Jarocinski and Smets (2008): 319-65.
[34] A term coined by the Financial Times in an article of January 4, 2001, which referred to Greenspan's statement that the Fed would intervene ex post to smoothen the effects of the burst of a bubble, but could not know ex ante about it.
[35] Obstfeld and Rogoff (2010) also note that the overly accommodative stance of the Fed's monetary policy starting in 2001 played a key role in the expansion of the housing market and of global imbalances.

57. Real estate and equity investment increased rapidly, and the housing boom turned into a bubble, with housing prices reaching well beyond what economic fundamentals would otherwise indicate.[36] The increased availability of mortgages led to a departure of the housing prices from fundamentals. Between 1997 and 2006, the price of the typical American house increased by 124 percent. During the two decades ending in 2001, the national median home price ranged from 2.9 to 3.1 times median household income. This ratio rose to 4.0 in 2004, and 4.6 in 2006.[37] Schiller in his article on "Irrational Exuberance" shows how far housing prices deviated from what would have been suggested by economic fundamentals (Figure 37).

Figure 37: Home Prices and Economic Fundamentals



Source: Schiller (2005).

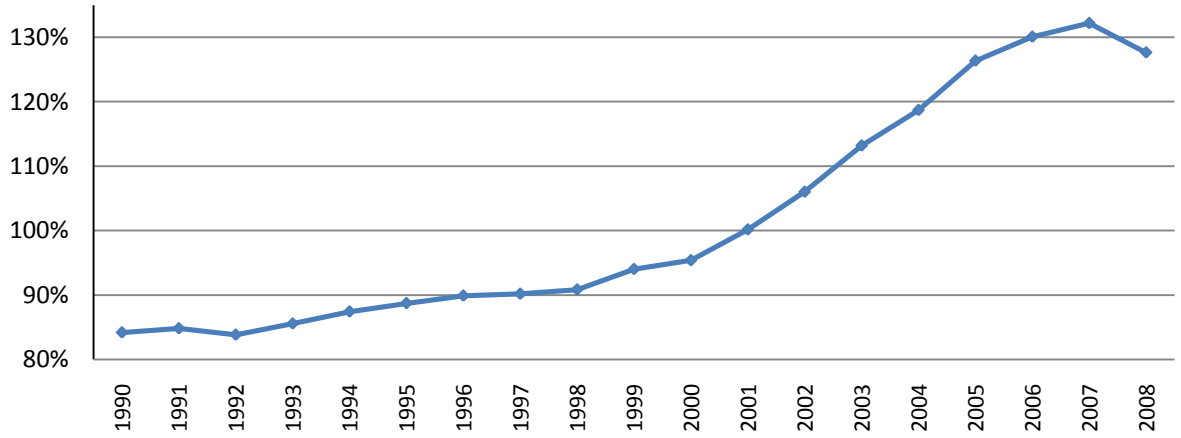
[36] World Economic Outlook, October 2008 (Chapter 1), International Monetary Fund. According to the WEO: "*The countries that have experienced the largest unexplained increases in house prices over the past decade are Australia, Ireland, and the United Kingdom; house prices in these countries were 20 to 30 percent higher in 2007 than can be attributed to fundamentals. A group of other countries -including France, Italy, the Netherlands, and Spain- have house price gaps of between 10 percent and 20 percent. The gap estimate for the United States –per about 7 percent- is smaller than for most other countries and has been narrowing compared with earlier estimates, partly reflecting the decline in U.S. house prices over the past 18 months.*"

[37] US Census Bureau.

58. In general, housing and real estate property represent an important share of household wealth in total household net worth.[38] Wealth effects from the real estate market and the recovery of the equity market made households feel richer, and hence, consume more. Financial innovations allowed households to refinance their mortgages, and capitalize their wealth gains in the housing markets.

59. Consumption, as well as household debt, increased rapidly during this period. Figure 38 shows that in 2001, U.S. household debt as a percentage of household disposable income was 100 percent. By 2007, it had increased to 132 percent. This 32 percentage point increase in household debt was mainly used to support household consumption. The boom was not only limited to the housing market. The U.S. stock market also increased by more than 50 percent from June 2003 to October 2007.[39] Figure 39 shows the evolution of households' net worth relative to disposable personal income. Disposable personal income has been constantly increasing over 1986-2009. However, net worth fell from 1999-2002 to rise again from 2002-2006. Hence, during 2002-2006 households saw their wealth increase as a consequence of soaring housing and equity markets.

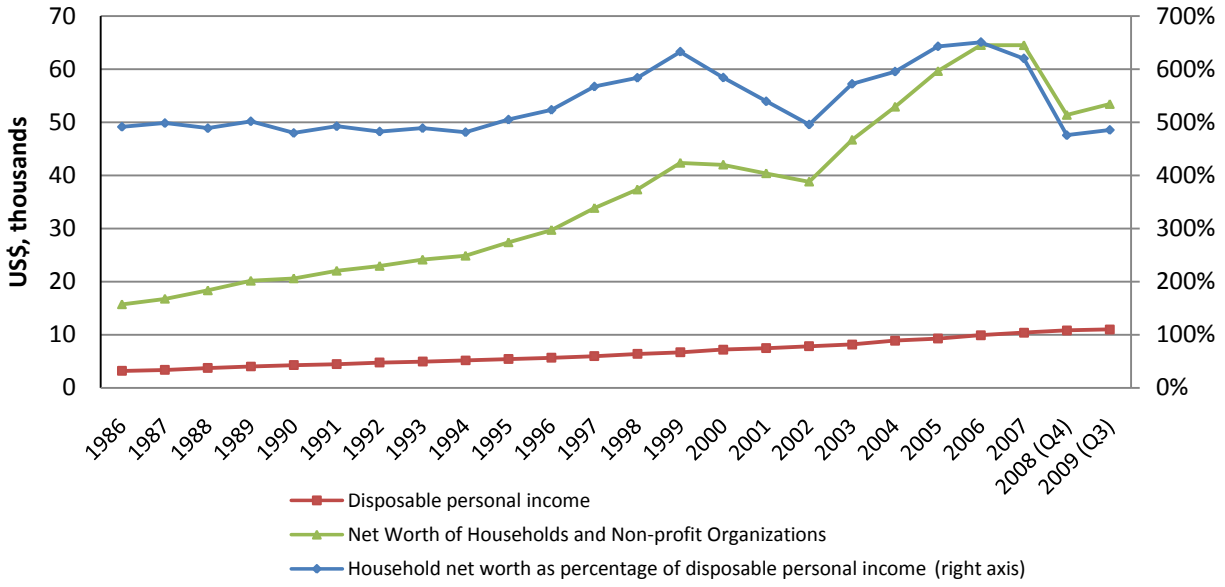
Figure 38: Household Debt as a Percentage of Personal Disposable Income



Sources: Bureau of Economic Analysis Data (2009), Federal Reserve, Flow of Funds Account (2009).

[38] Data from the Flow of Funds Accounts of the United States of the US Federal Reserve indicate that the share of real estate in total net worth for households and non-profit organizations was less than 30% in 2000, peaked at 40% in 2005 to drop to 37% and 34% in 2008 and 2009 (Q3), respectively.
[39] World Bank staff estimates (2010).

Figure 39: U.S. Household Disposable Income and Net Worth



Source: Federal Reserve, Flow of Funds Account.

60. Greenspan and Kennedy (2008) show that the increase in housing prices contributed substantially to the consumption boom, primarily via home equity loans and mortgage refinancing cash-outs. Empirical evidence for the link between housing wealth and consumption is found by Bostic et al. (2006), which uses micro-data to estimate the elasticity of consumption to both housing and financial wealth in the United States over the period 1989-2001. They find a substantially larger marginal propensity to consume from housing wealth than from financial wealth. In addition, Case et al. (2005), using panel data for 14 countries, report: "The importance of housing market wealth and financial wealth in affecting consumption is an empirical matter….[] We find at best weak evidence of a stock market wealth effect. However, we do find strong evidence that variations in housing market wealth have important effects upon consumption. [The results…] support the conclusion that changes in housing prices should be considered to have a larger and more important impact than changes in stock market prices in influencing household consumption in the U.S. and in other developed countries."

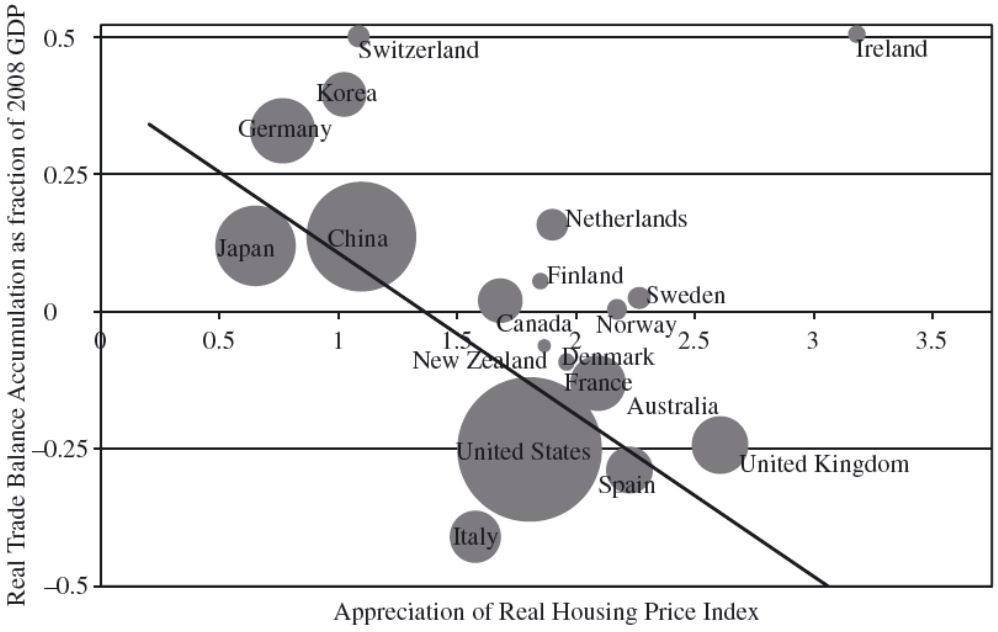
61. Equity can be extracted from houses through three channels: (i) free cash available to home sellers, which is equal to the value of existing home sale minus mortgage debt paid off at the time of sale and closing costs; (ii) home equity loans[40], which are equal to originations minus repayments resulting from other forms of equity extraction, and (iii) cash-out refinancing, which is refinance originations minus repayments of first liens resulting from refinancing. Greenspan

[40] Home equity loans are a type of loan in which the borrower uses the equity in their home as collateral. A home equity loan creates a lien against the borrower's house, and reduces actual home equity.

and Kennedy (2008) estimate that during the 1991-2006 period, free cash resulting from these liquidity channels alone averaged about $590 billion annually. Equity extracted through sales of existing homes accounted for about two-thirds of total free cash; home equity loans accounted for close to 20 percent; and cash-out refinancing about 13 percent.

62. The nexus between the asset price boom, consumption and the current account balances is studied empirically in a model by Laibson and Mollerstrom (2010). The authors find that asset price movements explain a substantial share of the cross-sectional variation in international financial flows (Figure 40). Using regressions with real housing price appreciation as the independent variable and the accumulated balance of trade as the dependent variable, they find for a sample of 18 OECD countries plus China that movements in residential home prices alone explain around 50 percent of the variation in accumulated current account deficits. The authors acknowledge that their regressions do not answer the question of causality; they point, however, to some preliminary evidence showing that the causality runs from asset bubbles to current account deficits, notably the fact that the consumption boom was largely financed by loans taken out on real estate.

Figure 40: Housing Price Appreciation vs. Balance of Trade Accumulation, 1996 to peak of housing market

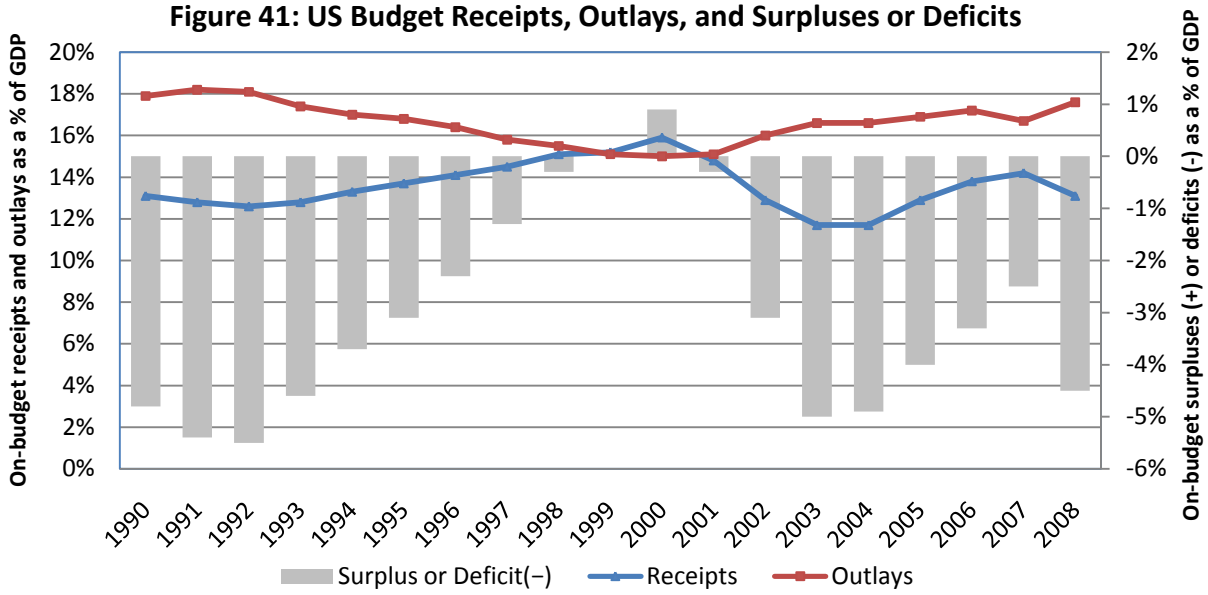


Source: Laibson and Mollerstrom (2010).

63. One additional factor contributed to the large U.S. current account deficits: the U.S. public sector dis-saving. The wars in Afghanistan starting in 2001, and in Iraq, starting in 2003, and the tax cuts enacted by the Bush administration in 2001 and 2003, compounded by the

effects of the recession on tax revenue, turned the U.S. government budget from a surplus of almost 1 percent of GDP in 2000 to a deficit of 4.5 percent[41] of GDP in 2008 (Figure 41). All else equal, this increase in the budget deficit implies a fall in public sector savings and national savings, and a corresponding swing of 5.5 percentage points of US GDP in the current account.

Figure 41: US Budget Receipts, Outlays, and Surpluses or Deficits



Source: Office of Management and Budget.

64. To summarize, loose monetary policy that was enacted to counteract the burst of the I.T. bubble and the 9/11 attacks created conditions of excess liquidity in which the housing and equity bubble could develop. This bubble increased households' wealth and consumption. As a result, the U.S. economy boomed. However, U.S. domestic production was not able to meet the increase in domestic consumption, which led to current account deficits with countries providing consumer goods to the U.S., including oil-exporting countries and consumer goods-exporting countries. As China had become the major producer of labor-intensive processed consumer goods by 2000, the United States ran an increasingly large deficit with China, which in turn ran trade deficits with many other East Asian economies that provided intermediate products to China.

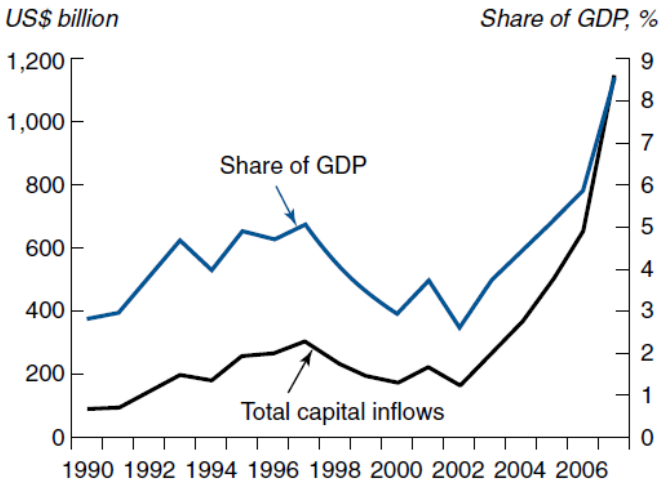
[41] Office of Management and Budget (2010). The deficit is defined here without Social Security funds.

65. The above-mentioned loose monetary policy and low short- and long-term interest rates not only helped bring about the housing bubble in the U.S., but also encouraged aggressive search for higher yields on a global scale reflected in record high volumes of capital flows to developing countries, which rose from $200 billion in 2000 to $1.2 trillion in 2007 (Figure 42). Large capital flows to developing countries are also attributable to the deep structural reforms in many developing countries that were undertaken during the 1990s and contributed to record-high investment-led growth in many developing countries in the same period (Figure 43).[42] The accelerated growth in many countries resulted in a sharp increase in the demand for (and prices of) natural resources, as well as trade surpluses in natural resource-exporting countries. This prompted a boom in commodity prices, which in turn further accelerated growth in natural resource-exporting developing countries (Figure 44). The investment-led growth in developing countries resulted in large trade surpluses in many advanced capital-goods exporting countries, such as Germany. Since the United States is the reserve currency issuing country, the foreign reserves accumulated through trade and capital account surpluses in other countries will return back to the U.S., in the form of purchasing Treasury bills or other investments, and this led to the capital account surplus in the United States.[43]

[42] The Global Economic Prospects of 2010 notes that the fall in borrowing costs during the 2003-07 period was associated with almost 70 percent of the increase in capital flows into developing countries and 80 percent of the increase in domestic consumption. Also, on average, between 2000 and 2007 investment-to-GDP ratios in developing countries increased by 5.2 percentage points compared with their 2000 levels. The GEP also indicates that more than half of the 1.4 percentage point increase in potential output growth rates in developing countries between 2003 and 2007 is directly attributable to the capital deepening during this period.

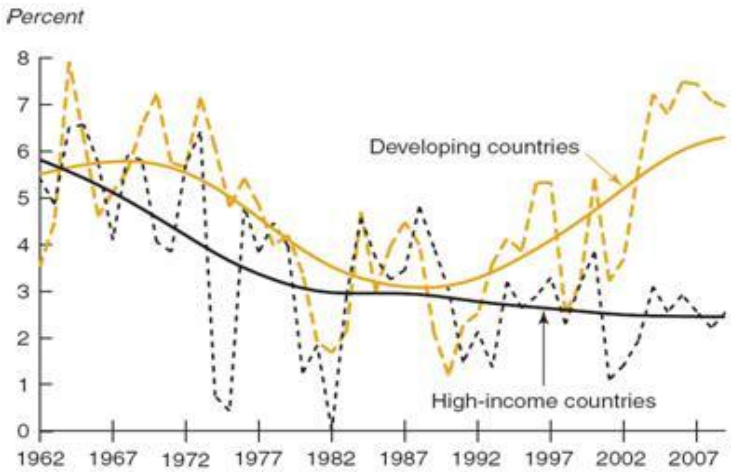
[43] Most scholars emphasize the high demand for US treasuries from trade surplus countries allowed the U.S. government to borrow more cheaply than otherwise, a phenomenon often referred to as the "exorbitant privilege" (Eichengreen 2010). However, more important than this privilege, is that as long as the US dollar is an accepted reserve currency, the funds to support the trade deficits will recycle back to the US either by purchasing treasury bill or other forms of investments and become US's capital account surplus to offset the current account deficits. This may appear that the investors have a preference for the US dollars (Bernanke 2005a, Bernanke et al. 2011). But in fact it is because the U.S. dollar is a reserve currency that the current account deficit financed by the reserve currency-issuing country must recycle back to that country.

Figure 42: Total Capital Inflows to Developing Economies



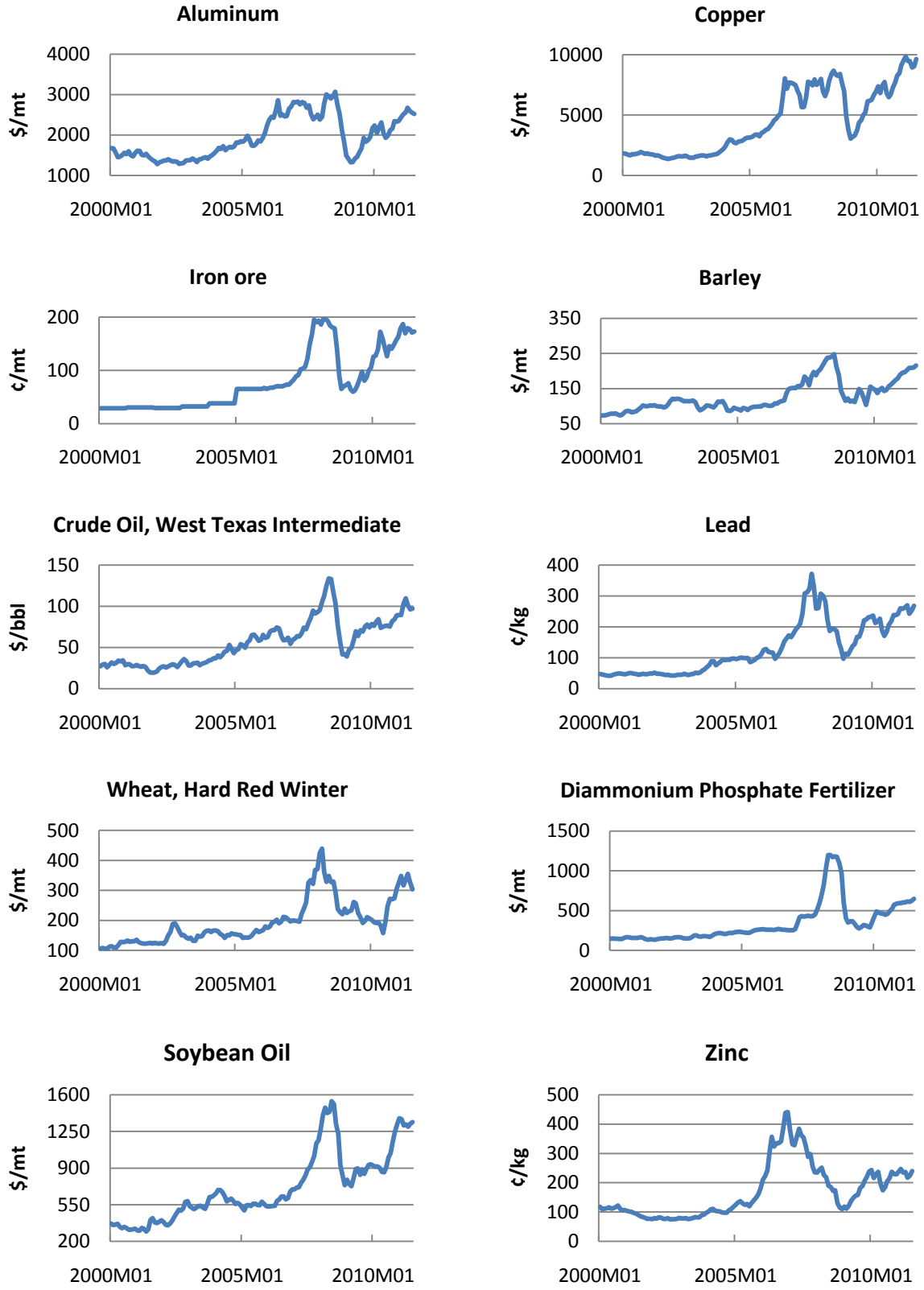
Source: World Bank, Global Economic Prospects.

Figure 43: Trend and Cyclical GDP Growth



Source: World Bank, Global Economic Prospects.

Figure 44: Selected Commodity Prices



Source: World Bank, Prospects Group.

66. Aggregate demand pressures emanating from the accommodative monetary policy were initially reflected in oil and other commodity prices, and finally led to an increase in headline inflation. The consequent tightening of monetary policy resulted in a correction of housing prices, triggered defaults on subprime loans, large losses for banks and financial institutions, sharp increases in risk aversion and complete lack of confidence and trust among market participants, and substantial deleveraging and large capital outflows from emerging markets. The earlier financial excesses were thus reversed in a disruptive manner.

III.3 Financial Deregulation, the Housing Bubble, and the Global Financial Crisis

67. The expansionary monetary and fiscal policy of the United States was the key factor in the emergence of the global imbalances. However, it was housing and financial sector policies aimed at expanding the mortgage market to borrowers that had up to that point not been considered creditworthy—the evolution of the so-called subprime mortgage market—and the financial innovations to support the subprime mortgages that were the primary causes for the burst of the bubble which had such a large unexpected systemic effect. Notably, the emergence of new financial instruments and derivatives initially seemed to lower the risk profile, but ultimately turned out to increase it substantially. As a result, when the housing bubble burst, the new financial innovations also led to a systemic financial crisis in the U.S. and the world. In this section, we will review the evolution of U.S. financial regulations and housing policies, as well as how the financial innovations led to the unexpected systemic risk.

68. Starting in the 1970s, U.S. government policy had emphasized deregulation to encourage business, which resulted in less oversight of activities and less disclosure of information about new activities undertaken by banks and other evolving financial institutions. One of the first steps in this direction was the creation of Money Market Mutual Funds (MMMFs). MMMFs had been established in response to interest rate ceilings on demand deposits (Regulation Q) and did not have restrictions on interest rates. A key regulation supporting the growth of the MMMFs was the Garn-St. Germain Act of 1982, which authorized banks to issue short-term deposit accounts with some transaction features, but no interest rate ceiling, thus effectively bypassing Regulation Q. While the Garn-St. Germain Act was intended to benefit the thrift industry (the so-called Savings and Loan associations largely aimed at financing real estate), it also allowed these firms to embark on types of financial transactions with new and higher risks.

69. Savings and loan (S&L) associations specialized in taking deposits with short-term maturity and making mortgage loans with long-term maturity. This asset-liability mismatch made them especially vulnerable to the costs of high interest rates; so when the Federal Reserve

increased interest rates to combat inflation in the late 1970s, most thrift institutions reported large losses. By 1982, the net worth of the entire industry approached zero. As a result, many institutions failed, but no large-scale action was taken, partly because of lack of funds at the Federal Savings and Loan Insurance Corporation, as well as inadequate banking supervision by the Federal Home Loan Bank Board.[44]

70. Notwithstanding these signs of increasing financial distress, the S&L industry underwent rapid expansion between the years 1982 and 1985. The reason was that investors saw substantial potential for profits in the new investment powers granted to thrifts, and invested in condominiums and other commercial real estate. Consequently, the investment portfolio of S&L associations shifted away from traditional home mortgage loans into higher-risk loans. These loans were funded by the rapidly growing supply of deposits that were attracted through above-market interest rates.

71. However, by the mid-1980s the boom in real estate went bust, partly as a result of the passage of the Tax Reform Act of 1986, which eliminated many of the tax shelters that had made real estate an attractive investment in the first place. As a result, many deposits were withdrawn and hundreds of institutions failed. The subsequent bailout of the savings and loan industry proceeded for several years and cost about $210 billion.

72. The rise in increasingly risky financial transactions went hand in hand with growing consolidation in the financial industry. Banks realized that their prospects of being bailed out by the government, in case their increasingly risky businesses failed, rose dramatically the larger they had become—meaning they became "too big to fail". Consequently, since the early 1990s they absorbed other banks as a way to become more immune against risks.[45] Between1990 and 1998, the number of banking institutions decreased by 27 percent as banks continued to merge. An important legislative step in support of greater banking consolidation was the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994, which eliminated previous restrictions on interstate banking and branching.[46]

73. An even more important legislative step encouraging the adoption of riskier financial products in the financial industry was the repeal in 1999 of the Glass-Steagall Act and its replacement by the Gramm-Bliley-Leach Act. This repeal essentially eliminated the separation between commercial banks (which had traditionally conservative policies) and investment banks

[44] Sherman (2009).
[45] Mallaby (2010): p. 11.
[46] One example of consolidation occurred in April 1998 when Travelers Insurance Group and Citicorp, the parent of Citibank, announced plans to merge and form Citigroup, Inc, taking in the combination of banking and securities dealing. Albeit not entirely compliant with the spirit of the Glass-Steagall act, bank executives structured the merger in a way that conformed to the Fed's increasingly liberal interpretation of the act.

(which had more of a risk-taking culture).[47] As a result of the adoption of the Gramm-Bliley-Leach Act, large banks could be a commercial bank, an insurance company, an asset manager, a hedge fund and a private equity fund at the same time. Consequently, banks with access to deposit insurance and Central Bank support pursued high-risk activities, thus endangering the soundness of the financial system as a whole.

74. Also, in 2004, the U.S. Securities and Exchange Commission relaxed the net capital rule which enabled investment banks to substantially increase the level of debt they could assume, fueling the growth in mortgage-backed securities supporting subprime mortgages. Mortgage-backed securities became increasingly popular in the 1980s; but it was not until the 1990s that they really took off. These securities include Collateralized Mortgage Obligations, Collateralized Debt Obligations (CDO's) and Collateralized Loan Obligations (CLO's), as well as CDO's of CDO's of CDO's (CDO3) which assembled a bunch of credit default swaps to mimic an underlying CDO.[48] These new instruments assembled a multiplicity of tranches, each of which represented a certain level of risk tolerance. They and the risk they implied became difficult to value; as a result, the financial system became prone to a high level of risk. The lack of transparency associated with financial innovation through securitization allowed even quasi-public institutions like Fannie Mae and Freddie Mac and prospective borrowers to avoid careful scrutiny. In this context, it became increasingly common for borrowers to misrepresent their income and to fail to provide written confirmation about their salary (the so-called NINJA loans).

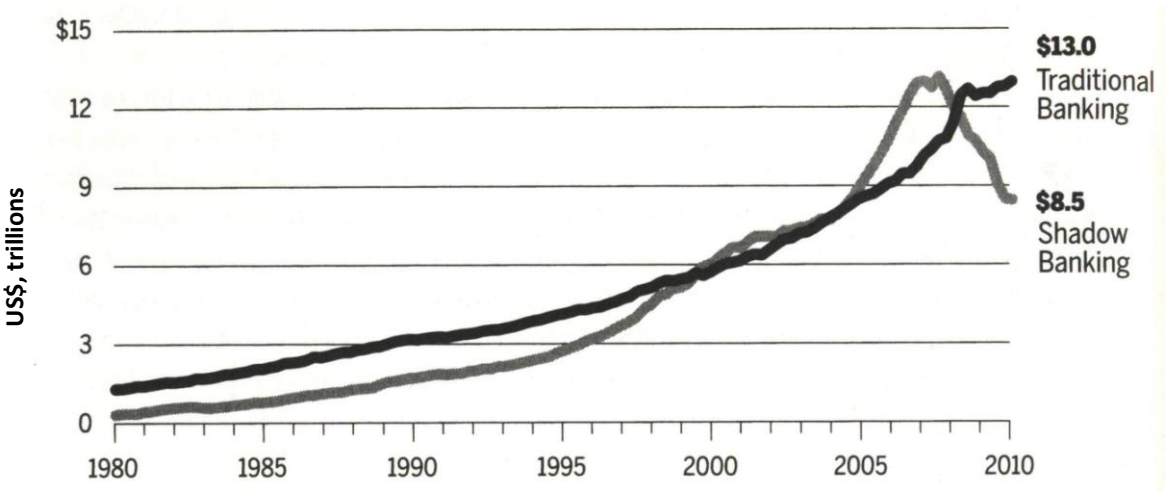
75. Unlike stocks, bonds and options, there was no clearinghouse for trades in most of the new derivative instruments. Moreover, the Commodity Futures Modernization Act of 2000 ensured that derivatives remained unregulated. In such conditions, derivatives trading expanded quickly, increasing from a total outstanding nominal value of $106 trillion in 2001 (1039 percent of U.S. GDP, and 331 percent of world GDP), to a value of $531 trillion in 2008 (3688 percent of U.S. GDP and 868 percent of world GDP).[49] However, the legal and technological infrastructure of the industry was inadequate to handle such an explosion of the volume of derivatives, which worsened the impact of the lack of regulation of derivatives.[50]

76. The development of mortgage-backed securities was largely driven by the shadow banking system (Figure 45), which experienced dramatic growth in the run-up to the crisis. The growth of the shadow banking system was partly the result of the perceived decline in the profit-

[47] Roubini and Mihm (2010): p.74.
[48] CDO's essentially bundled high-risk subprime mortgages and then sliced them into tranches (equity, mezzanine and senior). Purchasers of the equity tranche had the highest return and highest risk, while purchasers of mezzanine and senior tranches had correspondingly less return and less risk. If any homeowner in the underlying pool defaulted, the holders of equity tranches would see the highest loss.
[49] Bank of International Settlements, Semiannual OTC derivatives statistics at end-June 2011.
[50] Goodman, Peter S.: "Taking hard new look at a Greenspan legacy," New York Times, October 8, 2008.

making opportunities of traditional commercial banks that faced competition from nonbanks and their products, such as junk bonds and commercial paper. As a result, commercial banks began exiting the regulated sector.[51] The shadow banking system included nonbank mortgage lenders, structured investment vehicles (SIVs) and conduits, investment banks and broker dealers, money market funds, hedge funds and private equity funds and state- and local government-sponsored pools of auction-rate securities and tender option bonds. The common denominator of these new institutions was that they acted as banks, but were not regulated as such, further encouraging non-transparency in the financial system.[52]

Figure 45: Traditional and Shadow Banking Systems



Source: The Financial Crisis Inquiry Report (2011); Federal Reserve, Flow of Funds Report.
Note: Shadow banking funding includes commercial paper and other short-term borrowing (bankers acceptances), repo, net securities loaned, liabilities of asset-backed securities issuers, and money market mutual fund assets.

77. This non-transparency was of even greater concern, as all institutions operating as part of the shadow banking system had in common that they borrowed in short-term, liquid markets, but invested in long-term illiquid assets. For example, structured investment vehicles were financed through short-term commercial paper and money market funds relied on short-term funds from investors. The vulnerabilities emanating from this severe maturity mismatch between assets and liabilities were compounded by the fact that none of the institutions in the shadow banking

[51] Gorton and Metrick (2010): "Regulating the Shadow Banking System." Brookings Institution Press.
[52] Roubini and Mihm (2010): p. 76-80.

system had access to a lender of last resort, nor to a deposit insurance system. As a result, the threat from bank runs for the viability of the institution significantly increased, a fact that explains the collapse of the shadow banking system in the wake of the crisis.

78. The vulnerabilities of the shadow banking system were not appreciated by the rating agencies—on account of three factors. First was the fact that a significant part of the transactions had been moved off-balance sheet and therefore eluded the attention of the rating agencies. Second, ratings agencies found it increasingly difficult to assess the risk involved with new instruments, and resorted to mathematical models to value them that relied on optimistic assumptions minimizing measured risk.[53] Third, ratings were also skewed upward because rating agencies depended on the financial institution for employment and future contracts. As a result, excessive risk-taking was not recognized by rating agencies, effectively encouraging even riskier behavior.

79. Excessive risk-taking was further encouraged by a variety of moral hazard problems. For instance, a trader would be rewarded for placing a bet on a CDO, but would not be punished if this bet failed. In addition, rather than simply paying employees a salary, the traders and bankers who worked at the investment banks, hedge funds and other financial services firms were rewarded for their performance via a system of annual bonuses that consistently increased on an annual basis. These bonuses largely depended on whether the returns generated by the investment exceeded those of a risk-appropriate benchmark (also referred to as "alpha"). Investment banks found that such returns were more likely if the investment was associated with tail risk that means with an event that was very unlikely to occur. However, it is in the nature of a tail risk event that the likelihood of it occurring increases exponentially when more and more individuals undertake actions that are based on the assumption that it will not occur.[54]

The Fed's approach to bubbles—The Greenspan put

80. A further element in the fabric of creating a flawed governance framework was the reluctance of the Fed to regulate markets. This tendency had already been apparent through the prompt actions the Fed had undertaken to limit the market crash in 1987 as well as the effects of the liquidity crunch in 1998, in both cases by cutting interest rates and pumping in liquidity.[55] Monetary policy was considered not to be sufficiently effective to control bubbles at a time of exuberant expectations. In a speech on risk and uncertainty in monetary policy, Greenspan (2004) said in reference to the technology bubble: "Instead of trying to contain a putative bubble by drastic actions with largely unpredictable consequences, we chose, as we noted in our mid-1999 congressional testimony, to focus on policies 'to mitigate the fallout when it occurs, and

[53] Roubini and Mihm (2010): p. 67.
[54] Rajan (2010): p. 136.
[55] Miller, Weller and Zhang (2002).

hopefully ease the transition to the next expansion.'" This conclusion was based on the view that the degree of uncertainty about the nature of the economic environment in which monetary policy was operating had significantly risen owing to a number of structural economic changes, in particular rising productivity. Consequently, Greenspan advocated an approach to monetary policy that basically viewed the risks of intervention in potential bubbles to significantly outweigh the benefits. This view was based on an extremely optimistic assessment of the American economy and its long-term prospects driven by deep and positive structural change.

81. The Fed Chairman's statement that it was not possible to know a priori whether a bubble existed and it was therefore only possible to intervene ex post created the so-called "Greenspan put", essentially a belief among traders that the government would always bail out traders that needed to be rescued after a bubble had burst, but not intervene to stop it from rising.[56] So, effectively the Fed was providing insurance against the possibility of a market crash, a situation referred to as "meta moral hazard" by Miller, Weller and Zhang (2002).

82. Miller et al. cite evidence for such a meta moral hazard from: (i) a small survey of major fund managers and chief economists in London and New York carried out in early 2000 and (ii) a national opinion survey by the Securities Investor Protection Corporation (SIPC) of more than 2,000 individual investors. The former investigated the hypothesis that "confidence in an ever-increasing stock market is due to the belief that monetary policy will be used to support the market and that corrections will elicit reductions in interest rates until the market turns around". The result was that respondents believed that the Fed reacted more to a fall of the stock market than to its rise, and all except two believed that this type of reaction was in part responsible for the high valuations on the U.S. market.[57] It was this rather asymmetric conduct of the monetary authorities that reduced the risk premium and played a key role in lifting the whole market. It was as if investors came to believe that diversified equity instruments were insured subject to a deductible, i.e., with a market floor somewhat below current prices, but no ceiling.[58] In the particular case of the subprime market, the Fed refused to intervene in the market even after the Fed had received relevant warnings.[59] The subprime market was considered to be a good thing, the natural consequence of letting markets go free.

83. The system resulting from these financial innovations was characterized by (i) lack of transparency; (ii) underestimation of risk; and (iii) lack of understanding about how new

[56] Financial Times, January 4, 2001.
[57] Cecchetti et al. (2000): p. 75.
[58] Miller, Weller and Zhang (2002) provide empirical evidence for a decline in the risk premium. Survey was conducted by the company Securities Investor Protection Corporation (SIPC).
[59] "For example, Bronx-based Fair Finance Watch commented to the Federal Reserve about the practices of now-defunct non-bank subprime lender New Century, when U.S. Bancorp bought warrants for 24% of New Century's stock. The Fed, rather than take any action on New Century, merely waited until U.S. Bancorp sold off some of the warrants, and then said the issue was moot." Quote from Inner City Press of September 28, 2008.

financial products might behave when subjected to significant stress. The conditions above created a favorable environment for the housing and mortgage bubble to build. Essentially by injecting vast amounts of easy money into the economy and keeping it there for too long, the Fed muted the effect of the collapse of the technology bubble by inflating an entirely new one. However, the critical condition for the global economic crisis to build as it did was the expansion of the subprime mortgage market.

Subprime mortgage market

84. Policies aimed at making housing mortgages increasingly available for low-income households had been pursued for a long time, but gained significant prominence in the early 1990s. Steps toward operationalizing new low-income mortgage policies included the passing of the Federal Housing Safety and Soundness Act (1992), which aimed partly at reforming the regulation of the agencies and partly at promoting home-ownership for low–income and minority groups explicitly. In addition, the Department of Housing and Urban Development (HUD) was asked to develop affordable housing goals for the agencies and monitor progress.[60] As discussed further below, lobbying by the financial sector seems to have played a major role in bringing about legislative changes in support of lending to the subprime market.[61] Igan and Mishra (2011) explore the link between the political influence of the financial industry and financial regulation in the run-up to the global economic crisis and find strong evidence that spending on lobbying by the financial industry and network connections between lobbyists and the legislators were positively linked to the probability of a legislator changing positions in favor of deregulation.

85. A key tool within the government's policy framework to promote lending to the subprime borrowers was Freddie Mac and Fannie Mae. Freddie and Fannie guaranteed an increasingly large share of mortgage-backed securities, and enjoyed an implicit guarantee by the U.S. Treasury. As a result, foreign investors treated these securities as almost equivalent to buying U.S. Treasury bills. From the start, both Freddie and Fannie were subject to loose supervision. The regulator was subject to congressional appropriation which ensured that any effort by the

[60] Already in the mid-1990s HUD had loosened mortgage restrictions, so first-time buyers could qualify for loans that they were not able to get before. In 1995, Freddie Mac and Fannie Mae began receiving affordable housing credit for purchasing mortgage-backed securities, which included loans to low-income borrowers. As a result, the agencies began purchasing subprime securities. In 1996, HUD directed Freddie and Fannie to provide at least 42 percent of their mortgage financing to borrowers with income below the median in their area. The target was further increased to 50 percent in 2000 and 52 percent in 2005. In addition, HUD required Freddie and Fannie to provide 12 percent of their portfolio to "special affordable" loans (loans to borrowers with less than 60 percent of their area's median income. These targets increased over the years, with a 2008 target of 28 percent. In 2004, HUD increased the affordable housing goal from 50 to 56 percent.

[61] Rajan (2010) argues that the expansion of lending to the subprime mortgage market was the result of rapidly growing income inequality. However, there is little empirical evidence in support of a causal link between the rising income inequality and the expansion of subprime lending and in the United States.

regulator to enforce quality standards could result in budget cuts for the regulator. The combination of an activist Congress, government-supported private firms and a weak regulator allowed for the subprime market to boom.

86. Importantly, as housing boomed, the agencies found the high rates available on low-income lending particularly attractive, and the benign environment and lack of historical experience with low-income lending allowed them to ignore the additional risk. Under the Clinton administration, HUD steadily increased the amount of funding it required the agencies to allocate to low-income housing. Moreover, enforcement of the Community Reinvestment Act (CRA), which had already been enacted in 1977, was sharply enhanced under the Clinton administration,[62] leading to further increases in mortgages to low-income segments of the population, especially in the highly visible and politically sensitive metropolitan areas where banks were most likely to be scrutinized.

87. The boom in the subprime market was further significantly ratcheted up under the Bush administration. The Bush administration pushed up the low-income lending mandate on Freddie and Fannie to 56 percent of their assets in 2004, even as the Fed started increasing interest rates and expressing worries about the housing boom.[63] One factor explaining the huge increase in lending in subprime mortgages was the concern by Freddie and Fannie about the impact of accounting scandals that had been exposed in 2004 and made them more pliant to Congress's demands for more low-income lending.[64]

88. But lending from government-sponsored agencies does not explain the boom in the subprime mortgage market that led to the real estate bubble whose burst was at the core of the global financial crisis. As more money from government–sponsored agencies flooded into financing or supporting low-income housing, real estate prices began to generate ever higher returns, while the new financial derivatives developed in the shadow banking system created the impression that risks associated with mortgage lending had fallen. Perceptions of lower risk and higher returns in a booming real estate market—to a significant extent encouraged by the new financial derivatives—encouraged further expansion of lending by the private sector to low-income segments. In fact, while Freddie and Fannie played an important role in setting the stage for an expansion of the mortgage market to low-income households, by 2006, the vast majority of subprime mortgages (84 percent) came from private lending institutions and the share of subprime loans insured by Fannie and Freddie decreased as the bubble grew (from a high of

[62] Bhutta (2008).
[63] Federal Register Vol. 69 (211). HUD's Housing Goals for Fannie Mae and Freddie Mac. Also, see HUD news release No. 04-133: "HUD finalizes rule on new housing goals for Fannie Mae and Freddie Mac". The new policy foresaw a target of lending to low- and moderate–income households of 56 percent by the year 2008.
[64] "The Financial Crisis Inquiry Report," Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States. January 2011.

insuring 44 percent in 2003 to insuring 22 percent of all subprime loans in 2005).[65] Mian and Sufi (2009) show that the number of mortgages obtained in a zip code was *negatively* correlated with household income growth. At its prime in 2006, 25 million out of 55 million mortgages were subprime mortgages.[66] This vastly expanding role of the private sector in providing subprime mortgages was motivated by its high profitability and the expectation of an implicit government bailout.[67]

89. In addition, it was encouraged by a range of new government policies favoring lending to subprime borrowers. These policies had been catalyzed by lobbying of the financial sector which realized that policies aimed at expanding the mortgage market to low-income households would appeal to politicians representing low-income constituencies. An empirical study of the political economy of the subprime mortgage credit expansion carried out by Mian, Sufi and Trebbi (2011) finds that special interests, as measured by campaign contributions from the mortgage industry and constituent interests, and measured by the share of subprime borrowers in a congressional district, influenced U.S. government policy toward the housing sector during the subprime mortgage credit expansion from 2002 to 2007.[68] Specifically, from 2002, mortgage industry campaign contributions increasingly targeted U.S. Representatives from districts with a large fraction of subprime borrowers. The researchers find evidence that both subprime mortgage lenders and subprime mortgage borrowers influenced government policy toward housing finance during the subprime mortgage credit expansion. While the empirical evidence shows an influence of both factors, it does not determine their relative weight, i.e., whether the strong influence of constituents from low-income households or the campaign contributions by lobbyists were the key factors explaining the voting behavior of congressmen. However, given that the composition of congressmen's constituencies has been unchanged for a long time, while the support through lobbyists for key legislative changes peaked around 2003-2006, one may conclude that influence by lobbies representing the financial sector was the most important factor explaining the expanding government support for the subprime market in the run-up to the crisis.[69]

90. The subprime mortgage market was also fuelled by both public and private sector investments from Germany, Japan, China and a range of emerging economies that had large

[65] New York Times: October 4, 2008: "Pressured to take risk, Fannie reached tipping point."
[66] Mian and Sufi (2010).
[67] This is the so-called "Greenspan Put". See also paragraph 80.
[68] Key legislation adopted by congress includes the American Dream Downpayment Act of 2003, which aimed to increase homeownership among low-income communities by providing down payment and closing cost assistance. In addition, a number of laws that would have prevented predatory lending and weakened protection by the government in the case of default were discussed, but never put up for votes, including the Responsible Lending Act of 2005, the Prohibit Predatory Lending Act of 2005 and the Federal Housing Finance Reform Act (2005).
[69] Rajan (2010) argued that it was the increasing income disparity since the 1990s that led politicians to expand the mortgage market to low-income households so as to obtain the low-income constituencies' support. The empirical evidence here does not support his argument.

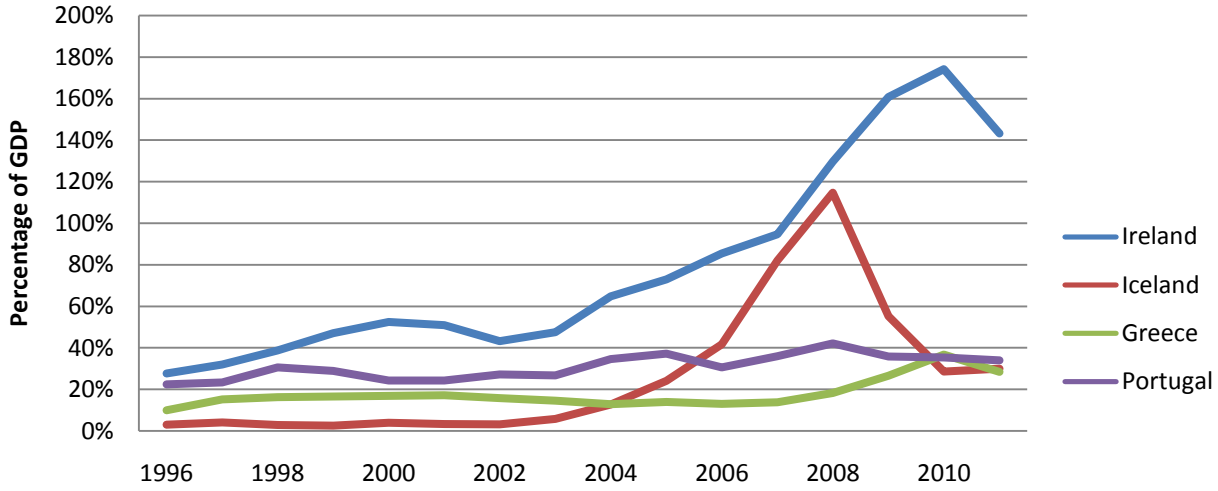
surplus savings as a result of the United States' current account deficits, as argued previously. Given that government debt had very low returns, the investment was mostly directed to the subprime market. Between 40 to 50 percent of the securities generated by American financial institutions were bought by foreigners.[70] Investors' confidence was boosted by the high ratings assigned by rating agencies to instruments such as mortgage-backed securities and collateralized debt obligations which securitized subprime mortgages and derived their value from mortgage payments and housing prices.

91. The U.S. financial system, especially the shadow banking system, was also a key element in the transmission of the crisis to Ireland and Iceland. Prior to the crisis, both Iceland and Ireland had relied on the U.S. financial system for funds, usually in the form of short-term debt, foreign-owned bank deposits, or foreign-owned portfolio equity. Fuelled by a rapid expansion of credit, the housing markets of both countries began expanding in 2000, resulting in a boom in property investment and construction. The wealth effect from this boom spurred higher levels of consumption and helped sustain high growth rates. Boosted by the real estate boom, Ireland's banking system ballooned to five times the size of the economy, and its external debt to over 1000 percent of GDP at the end of 2010.[71]

92. When in the wake of the crisis funds from the U.S. dried up, the banking system experienced a liquidity crunch, thus slowing credit to the real estate market. As borrowing became more expensive, the demand for housing started to decline, resulting in a fall in prices and an oversupply of housing. This put pressure on the balance sheets of banks, many of which had relied extensively on profitable mortgage loans to boost their earnings. The bailout or purchase of failing banks led to a crisis of confidence, leading to outflows of foreign assets in some economies. Figure 46 shows how many nations, in particular Ireland and Iceland, experienced major withdrawals of foreign-owned funds. The crisis exposed Ireland's vulnerabilities to financial contagion. The collapse of Iceland preceded that of Ireland by a few months, mostly because Ireland used the opportunity to refinance through the European Central Bank.[72]

[70] Reinhart and Rogoff (2009): pp. 242-45.
[71] IMF 2011 Article IV consultation with Ireland.
[72] Lane (2011).

Figure 46: Foreign-owned Bank Sector Liabilities



Sources: Bank for International Settlements; International Monetary Fund, World Economic Outlook.

93. To summarize, U.S. housing, monetary and fiscal policies were at the core of the U.S. low savings rates and the asset bubble in the real estate market. This asset bubble fuelled an extended consumption boom and rising current account deficits, which could be financed as a result of the reserve currency status of the U.S. dollar and were the key driver for global imbalances. Housing policies were influenced by the financial sector, which realized that the subprime market offered extensive opportunities for higher profits. The financial deregulation and low interest rates brought about by the Federal Reserve's monetary policy fostered expansion and innovation of the financial sector. Increasingly complex financial derivatives allowed the risks associated with the new instruments to be underestimated. When the housing bubble burst, this had significant implications for the U.S. financial system as a whole.

94. The so-called global savings glut brought about by economic policies of China and other East Asian countries was not the cause of low interest rates and the financial innovation boom. In fact, it was the excess liquidity created by countries with a reserve currency, in particular the United States through its expansionary monetary and fiscal policies, as well as housing policies that led to the U.S. current account deficits and to global imbalances. With the U.S. dollar being the main reserve currency, the reserves held by the central banks of surplus countries will primarily be invested in U.S. dollar assets. But what has been the role of China's policies and its savings rates in the evolution of the global economic crisis?

IV. Why Did China's Surplus Increase So Much?[73]

95. The large increase in China's current account surplus in general and with the U.S. in particular has attracted much attention. In this section, we will argue that these were caused by both the high corporate saving rate in China as a result of its dual track approach to reform and the relocation of the labor-intensive tradable sector of East Asian economies to China, which started in the 1980s but accelerated after China's accession to WTO in 2001.

96. First, China's large current account surplus reflects its high savings relative to its investment rates. Chinese savings and investment rates have been extremely high in recent years. With its current account surplus in excess of 0.5 percent of *global* GDP since 2005, China has accumulated foreign reserves in excess of the total reserves held by all other industrial countries combined.

97. Breaking down savings into household and corporate savings shows that, while household savings are at a high level, they broadly correspond to those of other Asian countries, such as India. The distinctive feature explaining very high savings in *China* are corporate savings. China's corporate savings rate is significantly above that of other Asian countries and other emerging markets. At about 20 percent of GDP—double the share of corporate savings in the U.S. and France—retained earnings finance more than one-half of enterprise investment. What explains the high savings rates in China's corporate sector?[74]

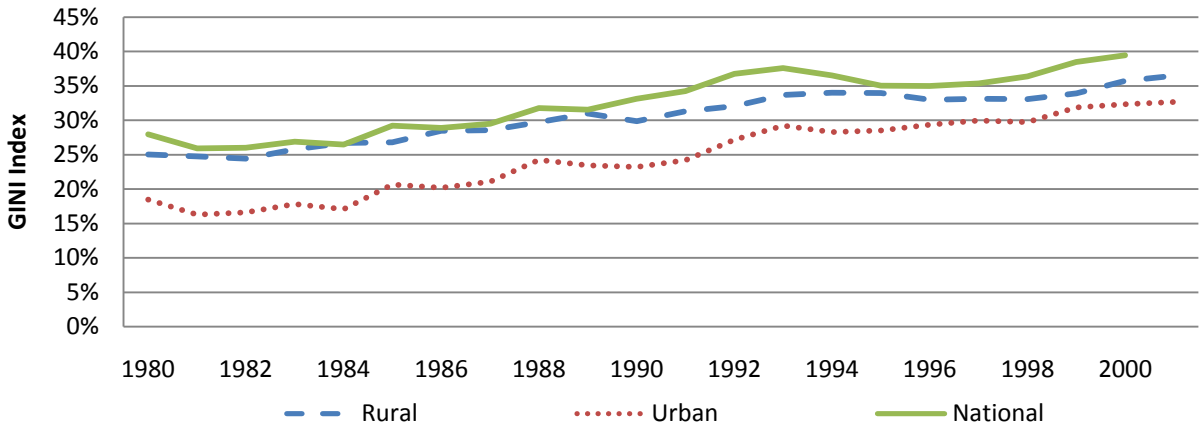
98. One of the main factors behind the high savings rates of China's corporate sector is the fact that China did not carry out all the necessary reforms at the same time. And those sectors that have not been reformed still have distortions which turned into unfavorable income distribution and concentration of wealth in the large state and private-owned enterprises. It is this income distribution and large concentration of wealth in the corporate sector that is an important factor behind the high savings rate in China (Lin 2011).

99. Since the 1990s, income disparity in China has become larger and larger. Figure 47 shows the evolution of income inequality in rural and urban areas and nationally for China during 1980-2000.[75] While China has attained significant progress against poverty (the proportion of the population living in poverty fell from 53 percent to 8 percent during 1981-2001[76]), income inequality has increased over the years—although not continuously—in rural and urban areas as well as in China as a whole. In general, the marginal propensity to consume of low-income people is higher; whereas the marginal propensity to consume of high-income people is lower. Therefore, if wealth is concentrated among high-income people, they will not

[73] Lin, Dinh and Im (2009):.
[74] Serven (2011).
[75] Ravallion and Chen (2007).
[76] Ravallion and Chen (2007).

consume as much, saving more and turning savings into investment. On the other hand, low-income people have a high marginal propensity to consume, but do not have enough funds. This represents an important reason for high household savings.

Figure 47: Income Inequality in China

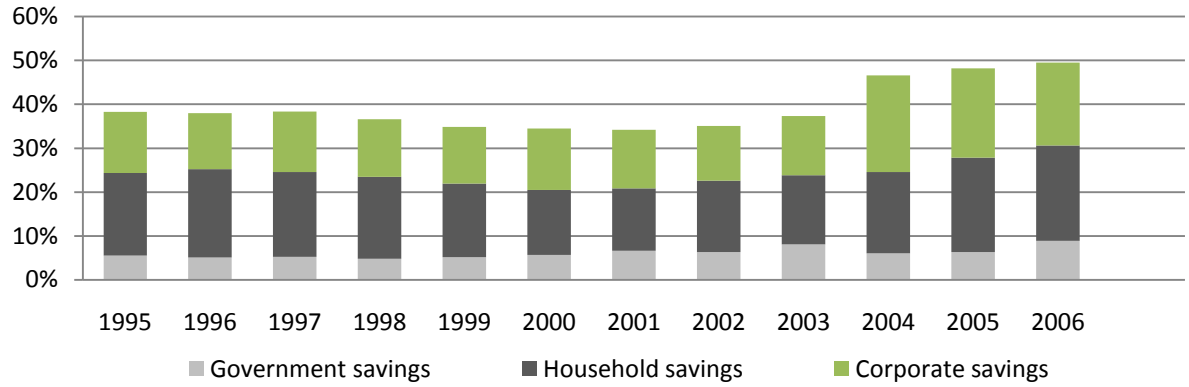


Source: Ravallion and Chen (2007).

100. What is the origin of the increase in income disparity and concentration of wealth in the large corporate sector in China? Income disparity and high corporate savings in China can be explained by three components of its current economic structure: the financial sector, the resource sector, and monopolies in the telecommunications and financial sectors. Figure 48 shows the evolution of saving in China from 1995 to 2006. Total savings as a share of GDP were below 40 percent until 2003. Household savings were high, but still were not very different from other countries such as India. But since 2004, savings increased significantly. This discrete jump was mainly driven by the hike in corporate savings.[77] Four reasons explain this development.

[77] See also Prasad (2011).

Figure 48: Chinese Corporate, Government, and Household Savings to GDP



Source: Flow of Funds Account Tables, China Statistical Yearbook, various issues; National Bureau of Statistics of China.

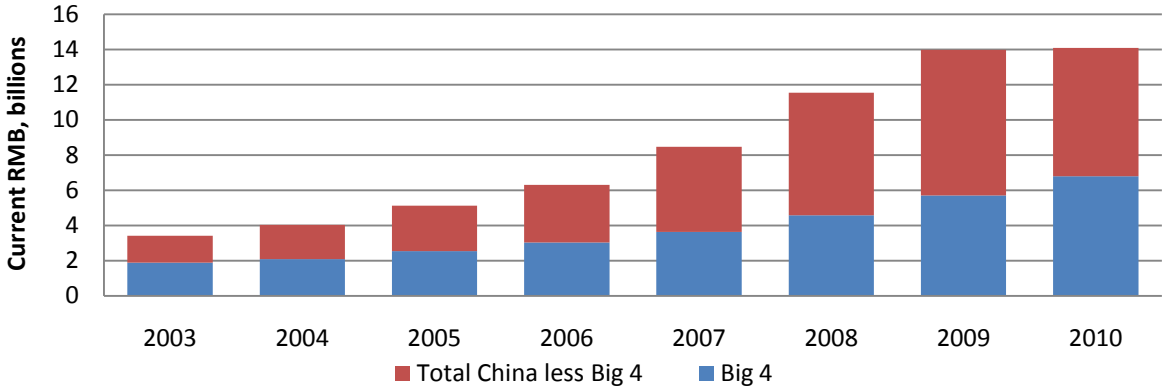
101. First, large state-owned enterprises have kept their profits as corporate savings.[78] In 1994, during the reform of taxation, a decision was taken that the government would not collect profit from SOEs for an unspecified period of time. In this context, a number of factors may have played a role. For one, this decision seemed a natural extension of the logic prevailing in SOE reform in the 1980s, which emphasized the independence of SOEs from the government. Second, the central theme of SOE reform during 1992-1994 was to increase managerial autonomy and reduce government intervention, as was evident in the State Council decision on "Regulation on Transformation of Management Mechanisms of SOEs" in 1992. Collecting dividends from SOEs would appear naturally as moving in the opposite direction. Third, without corporatization and some minimum progress in corporate governance, it would be practically difficult for the government to determine an acceptable rate of dividend without reopening the negotiation with the management of each SOE on profit division. Fourth, SOEs as a whole were in a poor financial situation in early 1990s. What the government could collect was not much, while the need for new capital injection was perceived as urgent and large. In 1994, the total profit of industrial SOEs was only 1.8 percent of GDP, which compared with 3.3 percent of GDP in 2003.

102. Second, China's financial structure is dominated by four big state-owned banks (Figure 49). Those big banks and China's equity market only provide access to financial services to large enterprises, either owned by the state or by wealthy individuals. Small and medium enterprises, which are very labor intensive, do not have access to any financial services.[79] This situation generates two implications for income distribution. On the one hand, China has an abundant

[78] Kuijs, Mako and Zhang (2005)..
[79] Lardy (2007).

labor force, but the development of labor-intensive small and medium-sized enterprises is repressed because they do not have access to financial services. As their growth is repressed, fewer job opportunities will be available, dampening wages in China. For poor people, the only source of income, other than transfers, is their own labor. The financial structure artificially reduces these job opportunities as well as wages, lowering the income of low-income people.

Figure 49: Total Financial Assets of China



Source: Bankscope.

Table 1: Chinese Interest Rates on Debt

	2001	2002	2003	2004	2005
State Owned Enterprises	2.46	2.23	2.67	2.86	2.61
Private Enterprises	4.84	4.64	4.61	3.81	4.57
Difference	-2.38	-2.41	-1.94	-0.95	-1.96

Source: Ferri and Liu (2009).

103. The World Bank Enterprise Survey conducted in 2004 provides further evidence for the concentration of lending. While among large firms, 65 percent had a loan from a bank or financial institution, only 32 percent of medium-sized firms and 20 percent of small firms had a loan. Reflecting this lack of bank finance, many of the non-state sectors face a high degree of credit constraints and have to resort to the informal lending market. Also, survey data from the IFC for China (Investment Climate Surveys Draft Country Profile-2003) show that SMEs are less reliant on banks for financing and more reliant on informal sources.

104. The highly concentrated financial structure also artificially lowers the cost of credit and capital, acting as a subsidy to those enterprises with access to financial services (Table 1). The subsidy is mainly financed by people who hold deposits in financial institutions but cannot

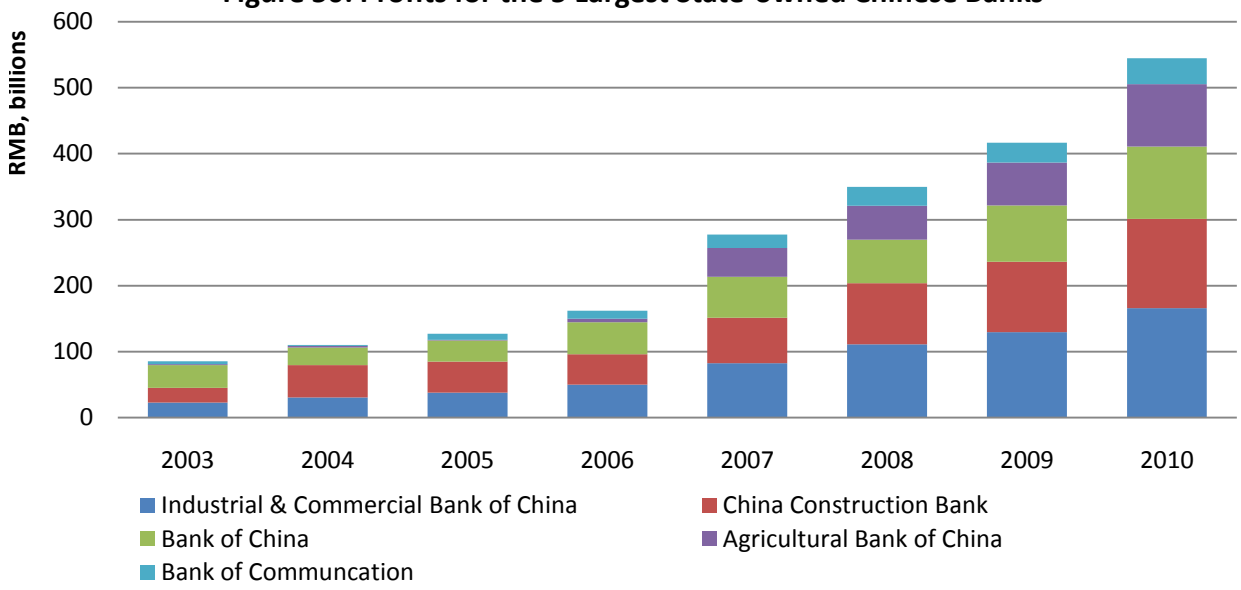
borrow from them, the relatively poor. Therefore, the financial structure is in effect asking the poor people to subsidize the investment of rich people or large corporations. This exacerbates the skewed income disparity and concentration of income in large corporations in China.

105. Third, the low royalty levy on natural resources boosts corporate savings. In particular, due to the scarcity of natural resources in China, their prices are relatively high. However, the Chinese government imposes little royalty levy on these resources. Domestic and foreign petroleum companies are exempt from royalty taxes on crude oil for levels of production less than 1 million tons. For crude oil production above this threshold, taxes range from 4 percent to 12.5 percent depending on the level of production. Royalty rates for natural gas are much lower: Companies are exempt from taxes for natural gas production less than 2 billion cubic meters, and pay taxes at rates of 1 to 3 percent for larger volumes.[80] To put this into perspective, the United States requires payment of royalties at a rate of 12.5 percent for onshore crude oil and natural gas production, and 16.7 percent for offshore production, regardless of the amount of the resource being extracted.[81] It is clear that state-owned and private mining companies in China benefit greatly from the low royalty payments. Thus, this also leads to a transfer of wealth to a small group of people.

106. Fourth, monopoly power in financial institutions and in the telecommunications industry makes these industries extremely profitable, with only a limited number of people having access to these monopoly rents. For example, the top five banks in China have experienced a 536 percent increase in profits in the past 7 years, recording RMB 545 billion in profits in 2010. Notably, the Agricultural Bank of China enjoyed an impressive 4,838 percent increase in profits during this period (Figure 50). In the telecommunications sector, China Mobile has had a 24-fold increase in profits during the past decade (Figure 51), and maintains a market share of 69.3 percent.[82] Since the '抓大放小'- reforms[83] SOE's have not been required to pay out dividends to their shareholders. With industrial profits increasing to trillions of RMB (Figure 52), corporate savings have increased as well. These are the four most important sources explaining the high rate of savings in China.

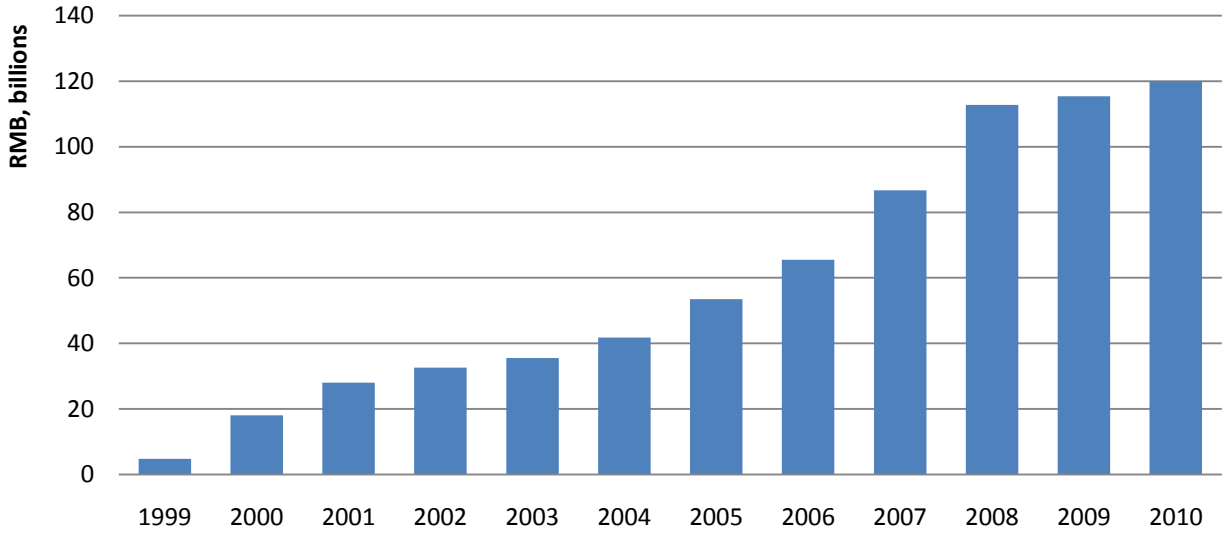
[80] These rates are stipulated in the "Provisional Regulations on the Payment by Sino-Foreign Cooperative Joint Ventures of Royalties for the Exploitation of Onshore Oil Resources," updated last in 1995.
[81] American Petroleum Institute, "The Facts about the U.S. Royalty Collection System." June 6, 2011.
[82] China Mobile Limited Annual Report 2010, pg 3.
[83] A broad term meaning "grasping the big, letting go of the small" which refers to the reforms described above.

Figure 50: Profits for the 5 Largest State-owned Chinese Banks



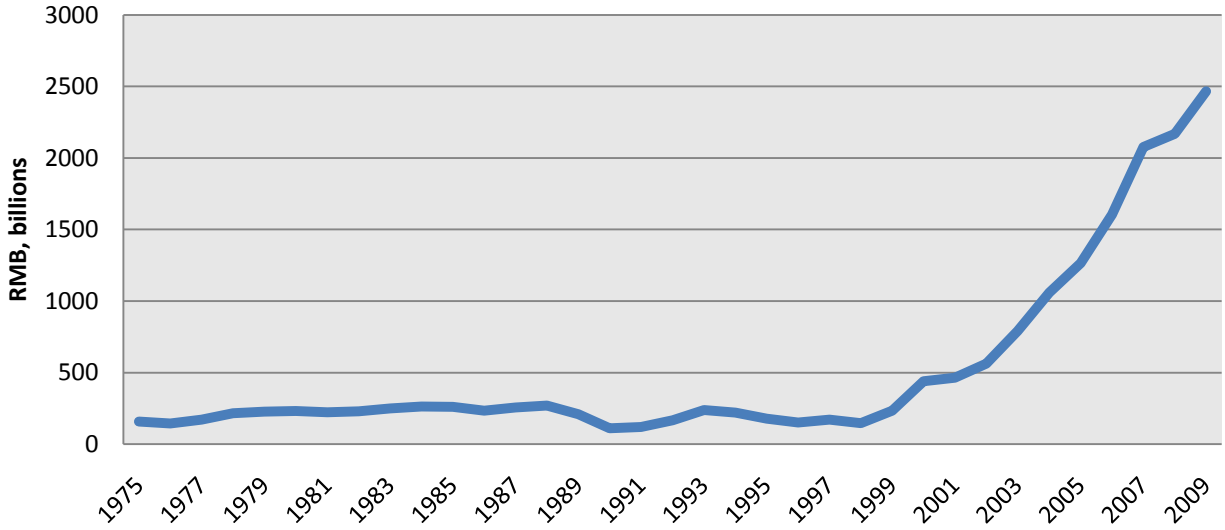
Source: Bankscope.

Figure 51: Profits for China Mobile



Source: China Mobile, Annual Investor Reports.

Figure 52: Chinese Real Industrial Sector Profits



Sources: CEIC; Organization for Economic Co-operation and Development national accounts data; UBS; and World Bank national accounts data.
Note: Industrial sector coverage is of enterprises with annual revenue above 5 million RMB.

107. This analysis suggests that without addressing the root causes of income disparity and corporate savings in China, consumption will be hard to increase, and excess savings and the large current account surplus would be hard to eliminate. In order to tackle its current account surplus, China needs to undertake a range of macroeconomic and microeconomic policy reforms.[84]

108. **Corporate governance** should be strengthened and dividend policies reviewed with a view to lowering retained earnings by enterprises. Requiring state-owned enterprises to issue dividends would reduce their retained earnings and possibly also increase households' consumption.

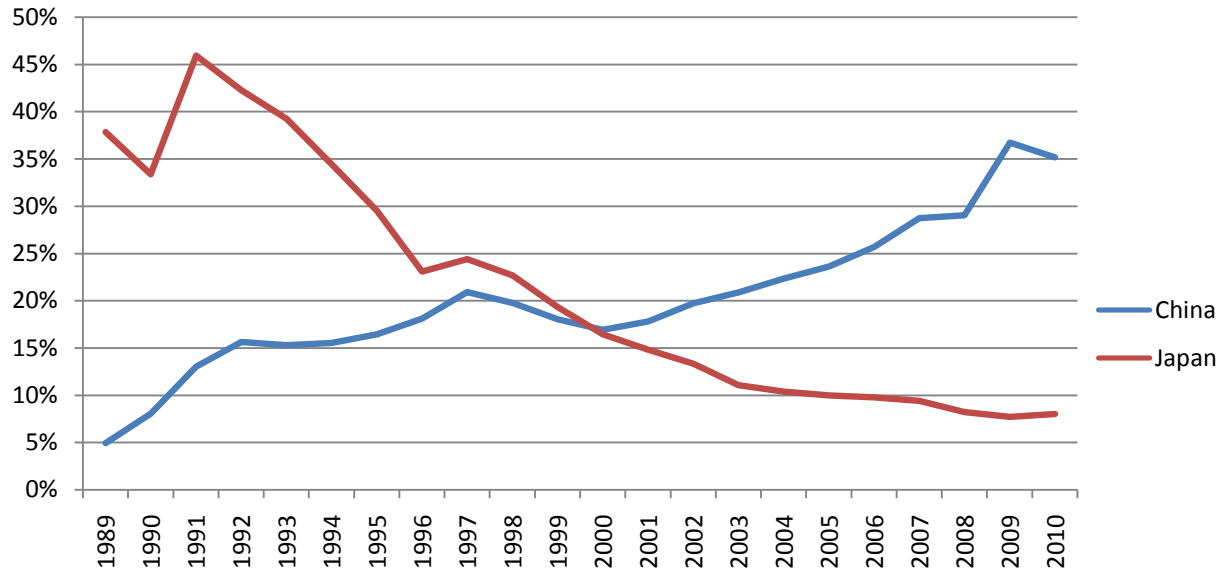
109. **Financial sector reform:** With a view to improving access by SMEs to credit, more competition needs to be introduced in the banking system, possibly by strengthening banking supervision, imposing a minimum share of large banks' loans granted to SMEs, and liberalizing the entry of small local banks. At this point, large corporations have access to loans at subsidized rates, but do not pay dividends.

110. **Royalty rates for coal companies and gas and other minerals**: Earnings are extremely high, but royalty levels are low. Therefore, royalties on state-owned and private enterprises should be increased.

[84] Kuijs (2006).

111. The current account balance of a country reflects its savings-investment balance. The above analysis explains China's large current account surplus. The reasons for the large and growing trade imbalance between the U.S. and China were, however, mainly the relocation of many of the low value-added labor-intensive products from other East Asian economies to China. The U.S. has long had a trade deficit with East Asia because of imports of labor-intensive products. This relocation concentrates the trade surplus of East Asia with the U.S. on China, which can be observed in the changing patterns of the United States' trade deficits with Japan and China from 1985 to 2009 (Figure 53).

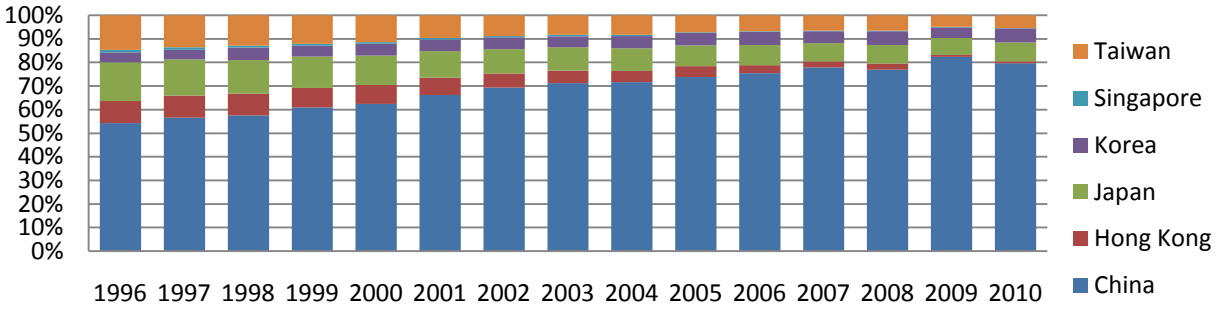
Figure 53: Share of US-Japan and US-China Trade Deficits in Total US trade Deficit



Source: United Nations Comtrade, World Integrated Trade Solution database; authors' calculations.

112. This relocation as well as the regional integration through production networks also caused China's trade deficit with other East Asian economies. Figure 54 illustrates the rising importance of China in U.S. imports from East Asia. Related to this, Figure 29 above shows how China's trade balance with other East Asian economies deteriorated, as China increasingly imported raw materials and semi-finished products from these countries. Many subcomponents of these commodities are produced in advanced countries and assembled in China, as a result of relocation of labor-intensive production to China. Figure 55 shows the decomposition of the production of an iPhone assembled in China, which illustrates the small share of value added in China versus inputs from other countries, notably Japan, Korea, Germany and the United States.

Figure 54: East Asian Exports for Simple Manufactured* Products to US



Source: U.S. Department of Commerce and U.S. International Trade Commission.
*Simple manufactured products correspond to SITC Revision 4 codes 6 and 81–85, covering paper, textiles, rubber, metal, and clothing products.

Figure 55: The Production Value Chain of an iPhone

Source: Rassweiler (2009).

V. Concluding Remarks

113. The global financial crisis caused the greatest crisis in the global economy since the Great Depression. Through the coordinated efforts of the G20 countries, the world economy has avoided the worst possible scenario. However, the world economy remains fragile as a result of high unemployment and large excess capacity in the advanced economies, high levels of sovereign debt and the crisis in the Euro-zone. What are some of the key findings and lessons to be learned from the global financial crisis?

114. First, this paper concludes that the global imbalance and the real estate asset bubble in the United States were largely brought about by U.S. domestic policy. The loose monetary policy that started in 2001 after the "dot-com" bubble burst, magnified by the financial deregulation and the subsequent various financial innovations, resulted in an exuberant boom in the U.S. housing market. The wealth effect from the housing boom and the financial innovation that allowed households to capitalize their gains in housing prices led to U.S. households' overconsumption and over indebtedness. The U.S.'s large current account deficit, made possible by its reserve currency status, was a result of both the households' over-consumption and the public debts due to the Afghanistan and Iraq wars.

115. Second, the analysis shows that whether a policy is successful should not be judged only by its immediate effects but also its longer-term and overall effects. The use of monetary policy to cope with the recession brought out by the burst of the "dot-com" bubble in 2001 could have been justifiable. However, with hindsight the policy was overused and extended for too long. Moreover, when the symptom of a problem appears, it is important to have a good analysis of the real cause of the problem. If in 2003 when the global imbalance, or specifically the U.S. trade deficit, first became an issue the attention was to understand the reasons for the U.S.'s over-demand instead of pointing the finger to other countries for the U.S.'s trouble, the exuberant boom in the U.S. housing market could have been restrained and the financial regulation in the U.S. could have been tightened much earlier. The global crisis could have been avoided or at least its adverse effect could have been reduced.

116. Third, any new policy initiative needs to be evaluated from both its positive effects and potential risk and negative effects. The crisis highlights the risks emanating from uncontrolled financial deregulation. The subprime mortgage crisis, as well as the collapse of the shadow banking system, illustrates the risks of lack of supervision of new financial instruments. Developing countries need to be vigilant in adopting appropriate levels of banking supervision that will prevent a recurrence of such a crisis. Most fundamentally, financial instruments and their interaction with one another need to be fully understood before they should be adopted.

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